

**Summary Report
November 2016 to June 2017 Private Well Sampling
City of Fairbanks Regional Fire Training Center
Fairbanks, Alaska
ADEC File Number 102.38.182**

July 2017



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Submitted To:
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31-1-11735-008

**SUMMARY REPORT
NOVEMBER 2016 TO JUNE 2017 PRIVATE WELL SAMPLING
CITY OF FAIRBANKS REGIONAL FIRE TRAINING CENTER
FAIRBANKS, ALASKA**

July 27, 2017

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADOT&PF	Alaska Department of Transportation & Public Facilities
AFFF	aqueous film-forming foam
bgs	below ground surface
°C	degrees Celsius
COC	chain of custody
CoF	City of Fairbanks
CUC	College Utilities Corporation
DHSS	Alaska Department of Health and Social Services
DNR	Alaska Department of Natural Resources
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
FNSB	Fairbanks North Star Borough
GAC	granular activated carbon
GHSA	Golden Heart Softball Association
GHU	Golden Heart Utilities
LHA	Lifetime Health Advisory
mg/L	milligram per liter
mV	millivolts
MW	monitoring well
ng/L	nanogram per liter
ORP	oxidation reduction potential
PAN	parcel account number
PFAS	perfluoroalkyl substances
PFC	perfluorinated compound
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
QA	quality assurance
QC	quality control
RFTC	Regional Fire Training Center
TestAmerica	TestAmerica Laboratories, Inc.
TOC	top of casing
UCMR	EPA Unregulated Contaminant Monitoring Rule
USGS	United States Geological Survey
WELTS	Well Log Tracking System
WO	work order
YSI	multiprobe water quality meter

EXECUTIVE SUMMARY

The Regional Fire Training Center (RFTC) burn pit is an active Alaska Department of Environmental Conservation (ADEC) contaminated site due to the presence of perfluorinated compounds (PFCs) in soil and groundwater (File Number 102.38.182). On behalf of the City of Fairbanks (CoF), Shannon & Wilson has identified and sampled offsite private wells near and downgradient of the RFTC beginning in January 2016. This report is the third in a series of private well sampling summary reports documenting our well search and private well sampling efforts from November 2016 to June 2017.

During the time period covered in this report we completed well searches in Areas 9 and 10, and sampled a subset of identified private wells (Section 2.1, Well Search and Sample Areas). To date we have sampled 128 private wells, 14 groundwater monitoring wells (MWs), and collected five surface-water samples. Within Area 1 through 9 we have sampled each identified, active well with indoor plumbing (i.e., category 1 or 2 wells) that we have received permission to sample. Analytical results for first-time samples are summarized in Figures 5 through 7. Analytical results for water samples collected to date are shown in plan and cross-sectional views in Figures 13 through 15. Although we will continue to follow up with some properties where well status is unknown, we consider the well search effort to be complete (Figure 1, Private Well Search and Sample Areas).

This report includes two quarterly well monitoring network sampling events (Section 2.4, Quarterly Well Monitoring Network). The January/February 2017 quarterly sampling event included 39 wells, while the April/May event included 25 wells. We assessed temporal data for select quarterly well monitoring network locations (Section 5.1, Quarterly Trend Analysis).

The primary contaminants of concern near and downgradient of the RFTC are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). The U.S. Environmental Protection Agency (EPA) has established a Lifetime Health Advisory (LHA) level for drinking water of 70 nanograms per liter (ng/L) for PFOS, PFOA, or the sum of the two. Following ADEC guidance, we consider combined concentrations greater than or equal to 65 ng/L to be exceedances of the LHA level.

There are 40 private well, four MW, and two surface-water sample locations with LHA combined concentrations exceeding 65 ng/L (Figures 8 and 9). The CoF has offered an alternative source or sources of drinking water at no cost to owners and occupants whose category 1 or 2 well water exceeds the LHA level (Section 2.7, Alternative Water Sources).

**SUMMARY REPORT
NOVEMBER 2016 TO JUNE 2017 PRIVATE WELL SAMPLING
CITY OF FAIRBANKS REGIONAL FIRE TRAINING CENTER
FAIRBANKS, ALASKA**

1.0 INTRODUCTION

Shannon & Wilson, Inc. has prepared this report to document our well search and private well sampling effort proximal to the Regional Fire Training Center (RFTC) at 1710 30th Avenue in Fairbanks, Alaska. The City of Fairbanks (CoF) owns the land and training facility and leases space at the facility to the State of Alaska and other entities. The RFTC burn pit is an active Alaska Department of Environmental Conservation (ADEC) contaminated site, File Number 102.38.182.

This report was prepared for the CoF in accordance with the terms and conditions of our City of Fairbanks Regional Fire Training Center Burn Pit Site Investigation services contract (Project No. FB-14-25), relevant ADEC guidance documents, and 18 Alaska Administrative Code (AAC) 75.335. The tasks described herein were conducted as authorized by our Professional Services Contract and in response to proposal numbers 31-2-16864-014 through -017.

1.1 Purpose and Objectives

The purpose of the services described in this report was to evaluate the potential for human exposure to perfluorinated compound- (PFC-) containing water in private water-supply wells. The first objective of the well search and sampling effort was to identify and sample private wells to determine if they have been affected by PFC groundwater contamination associated with the burn pit at the RFTC. The second objective of tasks described herein was to collect quarterly samples from a subset of identified private wells (i.e., quarterly well monitoring network).

1.2 Background

The CoF RFTC burn pit, or “combustible liquids pit,” was constructed in 1984 and used for fire-fighting exercises for approximately 20 years. Fire-fighting agents used during training in the CoF burn pit include water, protein-based foam, and aqueous film-forming foam (AFFF). AFFF has since been found to contain PFCs, a category of persistent organic compounds that are considered emerging contaminants. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are two PFCs commonly found at sites where AFFFs were used. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of increasing concern to environmental and health agencies.

The RFTC is located at 1710 30th Avenue, in Fairbanks, Alaska (Figure 1). The RFTC site occupies the eastern portion of the 21.24-acre Tract K, Alaska State Land Survey 80-64, owned by the CoF. Its geographic coordinates are approximately latitude 64.8211, longitude -147.7502. We first sampled onsite groundwater in July 2015 as part of our Phase 2 investigation, and encountered PFOS and PFOA concentrations above present-day ADEC groundwater cleanup levels. In November 2015, we collected PFC water samples from wells 0.2 mile and 0.8 mile northwest of the RFTC. PFCs were detected in both offsite samples up to 63 nanograms per liter (ng/L) PFOS and 21 ng/L PFOA.

On behalf of the CoF, we began to identify offsite private wells in January 2016 and collected our first private well samples from properties on 30th Avenue in February 2016. Our sampling efforts progressed through a series of well searches and water sampling tasks in ten search areas to date. Area descriptions and sampling results for Areas 1 through 3 are discussed in our *February to May 2016 Private Well Sampling Summary Report*, published in August 2016. Areas 4 through 8 are discussed in our *June to October 2016 Private Well Sampling Summary Report*, published in December 2016.

These areas are shown in Figure 1, Private Well Search and Sample Areas. Our scope of services included a well search for Areas 1, 3, 4, 5, 7, 8, and 9; we did not conduct a well search in Areas 2 or 6. To date we have sampled 128 private wells, 14 groundwater MWs, and collected five surface-water samples.

1.3 Geology and Hydrology

Fairbanks lies at the northern edge of the Tanana Lowlands physiographic province that forms a large, arcuate band of alluvial sediments between the Alaska Range and the Yukon-Tanana Uplands. The Lowlands consist of vegetated floodplains and low benches cut by the Tanana River, and sloughs and oxbow lakes that are former channel positions of the Tanana or Chena Rivers. The lowland subsurface typically consist of interbedded alluvial sand and gravel, covered in some locations by silty overbank deposits.

The unconsolidated sand and gravel of the Lowlands generally has a high transmissivity, where ice-free, resulting in unconfined groundwater flow. Depth to groundwater at the RFTC and other portions of the RFTC study area ranges from approximately 7 to 12 feet below ground surface (bgs), depending on local topographic changes.

Based on our experience and knowledge of hydrogeology in the Fairbanks area, the horizontal gradient in this area is relatively flat, typically averaging two to four feet per mile. According to a review of existing hydraulic conductivity literature for the Tanana Valley aquifer conducted in

2012, the geometric mean of groundwater velocity for the Fairbanks and Fort Wainwright area is 1.5 feet per day (Geomega Inc., 2012). Over short distances, however, the hydraulic conductivity can vary by several orders of magnitude, depending on the local grain size of the alluvium and the presence of permafrost.

A 1996 U.S. Geologic Survey (USGS) study measured groundwater elevations in 120 wells in the alluvial plain between the Tanana and Chena Rivers periodically between 1986 and 1988. This study used measured groundwater elevations to map two-foot water table elevation contours for March to April, July, and October. We have included water table elevation contours for July in Figure 13, for reference.

The USGS found that groundwater-flow direction fluctuates seasonally and is dependent on the relative levels of the Tanana River and Chena River. Groundwater is typically recharged by the Tanana River and drained by the Chena River, causing a northwesterly groundwater flow. Depending on various seasonal factors, groundwater may be recharged by both rivers, causing a westerly or northerly flow (Glass et. al., 1996).

The Fairbanks area is in a subarctic zone underlain by discontinuous permafrost. The maximum depth of permafrost measured in the Fairbanks area is in excess of 200 feet. Permafrost, where present, acts as a confining layer and impedes groundwater movement in some areas.

1.4 Contaminant of Concern and Regulatory Levels

The primary contaminants of concern in offsite wells are PFOS and PFOA. The U.S. Environmental Protection Agency (EPA) has established a Lifetime Health Advisory (LHA) level for drinking water of 70 ng/L for PFOS, PFOA, or the sum of the two. Following ADEC guidance, we consider combined concentrations greater than or equal to 65 ng/L to be exceedances of the LHA level. The CoF has established this as the level above which residents are provided with an alternative source or sources of drinking water.

The ADEC Contaminated Sites Program groundwater-cleanup levels for PFOS and PFOA were promulgated on November 6, 2016. Prior to the publication of these levels there were no state-level cleanup levels established for PFOS, PFOA, or other PFCs. Applicable regulatory levels are included in Table 1, below.

TABLE 1
APPLICABLE REGULATORY LEVELS

Agency	Media	PFOS	PFOA
U.S. EPA	Drinking water	70 ng/L	70 ng/L
ADEC Contaminated Sites Program	Groundwater	400 ng/L	400 ng/L

1.5 Scope of Services

The scope of our services summarized in this report included conducting well searches and first-time well sampling in Areas 9 and 10, and two rounds of quarterly sampling in Areas 1 through 8. The well searches and first-time samples reported herein were performed between November 2016 and June 2017. The two quarterly sampling efforts were conducted in January/February 2017 and March/April 2017. We reported analytical results to residents, CoF, and ADEC as they became available, and prepared and mailed fact sheets and other supporting information as part of the City’s public-outreach efforts.

Area 9 includes parcels within the area bound by Airport Way to the south, the Mitchell Expressway to the west, the Chena River to the north, and Washington Drive or Strand Avenue to the east. Area 10 includes parcels within the area bound by the Chena River to the south, Loftus Road to the west, and Birch Lane or Goldizen Avenue to the north, and the Chena River or Marion Drive to the east. Please note that the above-referenced Area 10 is smaller than the original Area 10 described in our proposal dated January 18, 2017.

For the purposes of this project a private well is defined as a privately owned water-supply well, typically leading to a home or business but in some cases supplying irrigation systems. Please note that this definition of private well does not match the ADEC Drinking Water Program regularity classification of a private water system, “a potable water system serving one single-family residence or duplex” (18 AAC 80, 2014).

The well search and sampling Areas 1 through 10 are depicted on Figure 1, Private Well Search and Sample Areas. Our well searches sought to identify private water-supply wells, the owner of the property on which the well is located, if the well is in use, how the well is used, and well logs or well details if available. Following completion of the well search, we collected analytical water samples for determination of PFCs from a subset of identified private wells. We submitted these water samples to TestAmerica Laboratories, Inc. (TestAmerica) for quantitation of the six EPA Unregulated Contaminant Monitoring Rule (UCMR) PFCs by Method WS-LC-0025.

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

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

If any of these occur, we should be retained to review the applicability of our recommendations.

This report should not be used for other purposes without Shannon & Wilson's review. If a service is not specifically indicated in this report, do not assume that it was performed.

2.0 FIELD ACTIVITIES

This section summarizes field activities performed between November 15, 2016 and June 20, 2017, in an effort to identify and sample private water-supply wells in our previously described search areas. We also include field activities relating to collecting quarterly samples from a subset of identified private wells (i.e., quarterly well monitoring network).

2.1 Well Search and Sample Areas

Our Area 9 and 10 well search procedures included:

- downloading a list of parcels and the owners of those properties from the Fairbanks North Star Borough (FNSB) property database;
- referencing the Alaska Department of Natural Resources (DNR) Well Log Tracking System (WELTS) and subsurface water rights files listed on the DNR Water Estate Map; and
- obtaining Golden Heart Utilities (GHU) and College Utilities Corporation (CUC) municipal water connection records for parcels within the search areas.

On November 10, 2016, we expanded the search area to include Area 9. We revised the well search letter template, informational fact sheet, and *Private Well Inventory Survey Form* used in the Area 1 through 8 well searches (Appendix A, Public Correspondence). The updated *Survey Form* includes check boxes for water deliveries and the use of water for gardening. We prepared envelopes including the well search letter, one-page fact sheet, *Private Well Inventory Survey Form*, and pre-addressed return envelope. Using FNSB records, we developed a list of property owners within Area 9 and prepared maps to cross-reference with property records during the door-to-door well search.

We also prepared an advisory letter to properties reportedly connected to the municipal water system, informing them of the project and requesting that they contact us if they have an active water-supply well (Appendix A). Other than the advisory letter we did not attempt to contact these property owners and occupants. The Area 9 advisory letter was mailed to the listed FNSB mailing address for each parcel on November 18. No letters were returned by the U.S. Postal Service.

On November 21, we conducted the door-to-door well search for Area 9. We hand-delivered the well search letter to the owners or occupants of both residential and commercial properties. We made a reasonable attempt to contact each owner or occupant in the search area. Where we were unable to make contact in person, we followed up via telephone where contact information was available, made multiple visits to the property in question, and/or questioned nearby property owners.

We completed a *Private Well Inventory Survey Form* for each identified well. In some cases the *Survey Forms* were completed by the owner or occupant themselves, in others they were completed by Shannon & Wilson personnel in person or via telephone. Appendix B includes *Survey Forms* for Areas 9 and 10, as well as revised or new *Survey Forms* for properties in Areas 1 through 8.

We used information obtained from completed *Survey Forms* and subsequent conversations with property owners and occupants to categorize wells based on use. These category designations were developed in coordination with the CoF and ADEC, and are described as follows:

- Category 1: wells that are used for drinking or cooking, as reported by owners or occupants.
- Category 2: wells that are used for dish washing and other domestic purposes. Homes or businesses where the occupants report that they do not drink the water, but where water-supply wells lead to kitchen or bathroom faucets, are considered category 2 wells.

- Category 3: wells that are used for vegetable gardening, and are not connected to indoor plumbing. These wells are considered non-drinking-water wells.
- Category 4: wells that are used for industrial and outdoor purposes only, such as irrigation or cleaning. These wells are considered non-drinking-water wells.

We identified three parcels with confirmed active wells and one confirmed unused water well within Area 9. Well search results are summarized in Tables 2 and 4, organized by presence or absence of a well. Please note that in most cases well depths are reported by owners, occupants, or developers. In some cases depths were obtained from well logs, drilling records, or were measured by Shannon & Wilson personnel these depths are marked with an asterisk. The results of the well search in Area 9 are depicted in Figures 3 and 4, alongside the well search results for Area 10.

**TABLE 2
AREA 9 WELL SUMMARY**

Yes – active well	3
Yes – inferred well	0
Yes – unused well	1
Unknown	1
No – inferred	17
No – confirmed	37
Total parcels	59

On January 27, 2017, we expanded the search area to include Area 10. Our well search methods were the same as those used for Area 9, but we waited to receive the results of the first round of well testing before preparing and mailing the advisory letter. We began contacting the owners and occupants of properties reportedly not connected to the municipal water system in Area 10 in person on February 2.

We modified the advisory letter for Area 9 to include a regional results map depicting concentrations below the LHA level in Area 10. We mailed the Area 10 advisory letter on March 21 (Appendix A). Seven letters were returned by the U.S. Postal Service as undeliverable with no forwarding address.

We identified 20 parcels with confirmed active wells and one inferred water well within Area 10. Well search results are summarized in Tables 3 and 5, organized by presence or absence of a well. We identified monitoring wells (MWs) associated with historical petroleum groundwater

contamination on two residential parcels in Area 10. These properties are indicated as “no – confirmed” because they do not have private wells. The results of the well search in Area 10 are also depicted in Figures 3 and 4.

TABLE 3
AREA 10 WELL SUMMARY

Yes – active well	20
Yes – inferred well	1
Yes – unused well	0
Unknown	2
No – inferred	117
No – confirmed	44
Total parcels	184

We were unable to contact all of the owners and occupants in Areas 9 and 10 during our well search. These properties are indicated as “yes – inferred” or “unknown” in Tables 4 and 5. We did not sample all wells indicated as “yes – active well” in Tables 4 and 5. There are two confirmed wells in Area 9 (Table 4), and 10 confirmed wells in Area 10 that we do not intend to sample unless requested to do so by the owners or occupants of these properties (Table 5).

Primarily on January 19, February 2, and March 29, we revisited parcels whose well status was previously classified as “yes – inferred well” or “unknown” in previous well search areas (Areas 1 through 8). Some of these parcels appear unoccupied or abandoned, some were contacted multiple times and considered a passive refusal to sample. We will continue to periodically follow up with these properties as appropriate.

2.2 Private Well Sampling

We have conducted multiple private well and MW sampling events between November 2016 and June 2017. Shannon & Wilson personnel Marcy Nadel, Geologist; Tiffany Green, Environmental Scientist; Robbie Deister, Geotechnical Engineer; Sheila Hinckley, Environmental Scientist; and Craig Beebe, Geologist collected analytical water samples from private wells and MWs in the time period covered in this report. These individuals are State of Alaska Qualified Environmental Professionals per 18 AAC 75.333[b] and 18 AAC 78.088[b]. Copies of the original *Private Well Sampling Logs* and *Monitoring Well Sampling Logs* are included in Appendix C.

We collected water samples from most identified private wells in these geographic areas. Some outdoor wells were inoperable in the wintertime. We collected the private well samples from a

location in the plumbing upstream of water-treatment systems or water softeners, where possible. Samples collected downstream of water softeners or other in-home treatment systems are listed in Section 2.12, Deviations. For the purposes of this project we do not consider small (i.e., less than 18 inches in height) particulate filters to be treatment systems.

We purged the systems prior to sampling by allowing the water to run until water parameters stabilized and the water appeared clear. We measured these parameters using a multiprobe water quality meter (YSI) and recorded pH, temperature, and conductivity approximately once every three minutes until sample collection. The following values were used to indicate stability for a minimum of three consecutive readings: ± 0.1 pH, ± 0.5 degrees Celsius ($^{\circ}\text{C}$) temperature, and ± 3 percent conductivity. Example private well sample locations are shown in Appendix D, Project Photographs.

For residential and commercial systems we discharged purge water to an indoor sink or to the ground surface. In some cases indoor plumbing leads to the municipal sewer system; in other cases it leads to a private septic system. Following parameter stabilization, we collected PFC water samples using laboratory-supplied containers.

On November 15, we collected four private well samples in Areas 5 and 8 (WO 23633). This sampling event consisted of one private well located on Davis Road in Area 5 and three private wells on Holden Road and University Avenue in Area 8.

On November 28, we collected three private well samples in Areas 8 and 9 (WO 23892). This sampling event consisted of two private wells located on Alston Road and Holden Road in Area 8 and one private well on Boat Street in Area 9.

On December 14, we collected one private well sample each in Areas 5 and 8 (WO 24461). On December 12, a GAC system was installed by Arctic Home Living at 3350 Holden Road. Arctic Home Living recommended that a post-treatment sample be collected from the GAC system outlet after the installation was complete. We collected the post-treatment sample (407429-D) and a sample from a private well on University Avenue in Area 8.

On January 10 to 13, 16 to 20, and 23 to 25 we collected mainly quarterly monitoring network samples from Areas 1, 3, 5, and 8 (WOs 25170, 25173, and 25288). We collected 38 quarterly samples and one first-time sample from a well on University Avenue in Area 8 during consecutive sampling events in January.

On February 6 to 8, we collected mainly first-time private well samples in Area 10 (WOs 25707 and 25710). The sampling event mainly consisted of eight private well samples from Area 10, one from Area 3, and one quarterly sample.

On April 3 to 5, we collected quarterly monitoring network samples from Areas 1, 3, 5, and 8 (WO 27373). This sampling event consisted of 16 quarterly samples.

On April 17 to 19 we collected mainly quarterly monitoring network samples from Areas 1, 3, 5 and 8 (WOs 27604 and 27605). The sampling event consisted of seven quarterly samples and two first-time private well samples from Alston Road in Area 8. One of the quarterly monitoring network samples is a groundwater MW (sample *MW-507*).

On May 8, we collected two first-time private well samples and one quarterly sample (WOs 28113 and 28115). The first-time samples were collected from Areas 5 and 10, while the quarterly sample was collected from an irrigation well in Area 3.

On May 15, we collected one first-time private well sample and one quarterly sample (WO 28375). The first-time sample was collected from Birch Lane in Area 10. The quarterly sample was collected from 30th Avenue in Area 1.

On June 6, we collected two first-time private well samples (WO 28929). The samples were collected from wells in Area 5. On June 20, we collected one private well sample from 30th Avenue in Area 1 (WO 29312).

2.3 Monitoring Well Sampling

For groundwater MWs, we collected analytical water samples using a submersible pump and disposable non-Teflon tubing. Two private well samples were collected using a peristaltic pump (Appendix D, Project Photographs). These wells are located at 2605 Picket Place (sample *540331-1*) and 3198 Holden Road (sample *168246*). They were sampled using a Shannon & Wilson pump because they are either temporarily or permanently out of service. To date we have collected two equipment-rinsate samples, in adherence to the prescribed minimum 20-percent frequency for the overall project. These samples, *EB-304A* and *EB-507*, are described in our previous reports.

We measured the total well depth and depth to water from the top of casing (TOC) in each MW, in order to calculate well depth bgs. The following values were used to indicate stability for MWs: ± 0.1 pH, ± 0.2 °C temperature, ± 3 percent conductivity, ± 0.10 percent milligrams per liter (mg/L) dissolved oxygen, ± 10 millivolts (mV) oxidation reduction potential (ORP), and

turbidity. Where it was possible to calculate the volume of water inside of a MW, in cases where groundwater parameters were slow to stabilize we collected samples after three or more well volumes had been purged.

We treated MW purge water using a granular activated carbon (GAC) filter prior to discharge. We did not treat purge water from the Golden Heart Softball Association (GHSA) irrigation wells or other private wells.

2.4 Quarterly Well Monitoring Network

We performed two quarterly well monitoring network sampling events during the time period covered in this report, one each in January/February and April/May 2017. The wells included in these events are shown in Figure 2, Quarterly Well Monitoring Network. The quarterly well monitoring network, per discussions with the CoF and ADEC, includes private wells whose combined PFOS and PFOA concentration exceeds 35 ng/L, or half of the EPA LHA level, and are considered drinking-water wells (category 1) or possible future drinking-water wells (category 2); and active private wells (categories 1, 2, 3, and 4) that are adjacent to or near wells whose combined concentration exceeds 35 ng/L.

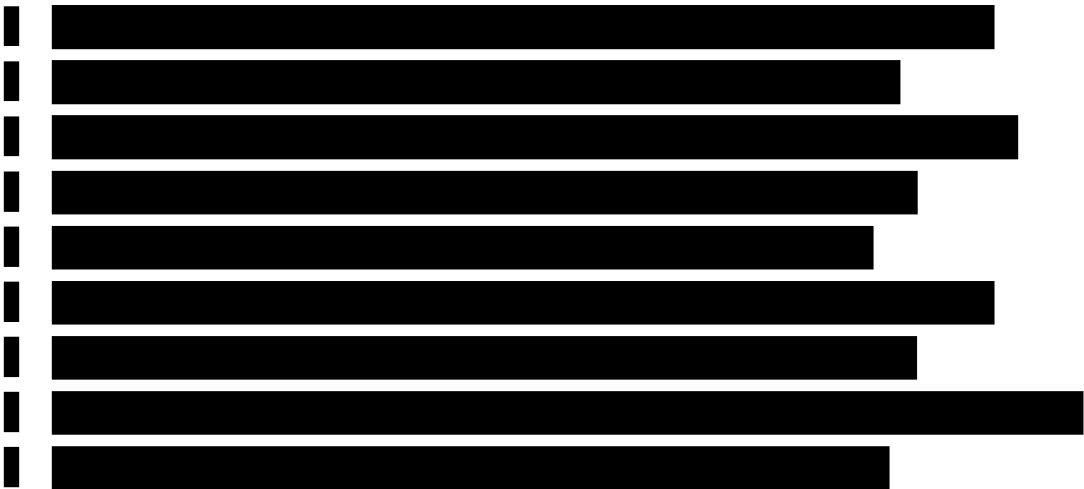
Near is defined as within two residential parcels or within one commercial or industrial parcel, not including roadways, in Area 1 south of the Mitchell Expressway. Near is defined as within two residential parcels, one residential and one commercial or industrial parcel, or one commercial or industrial parcel, not including roadways, in Areas 2 and 4 through 10. We do not apply this criteria to the immediate vicinity of the FNSB Parks and Recreation complex in the north portion of Area 1 and Area 3, as these parcels are considerably larger than those in other search areas. Robert Burgess, the ADEC project manager for the RFTC, indicated ADEC's concurrence with these criteria by e-mail on July 12, 2016.

In March 2017, criteria for inclusion in the monitoring network was revised to exclude those homes and businesses where municipal water connection is planned for 2017. The quarterly well monitoring network includes only one groundwater MW: Alaska Department of Transportation & Public Facilities (ADOT&PF) MW-507, included due to its strategic location in an area with few private wells.

The first quarterly sampling event occurred in July 2016 and included 10 wells. The second quarterly sampling event occurred in October/November 2016 and included 11 wells. The third sampling event occurred in January/February 2017 and included 39 wells. The fourth sampling event occurred in April/May 2017 and included 25 wells. In some cases we were unable to sample wells that meet the above-listed criteria.

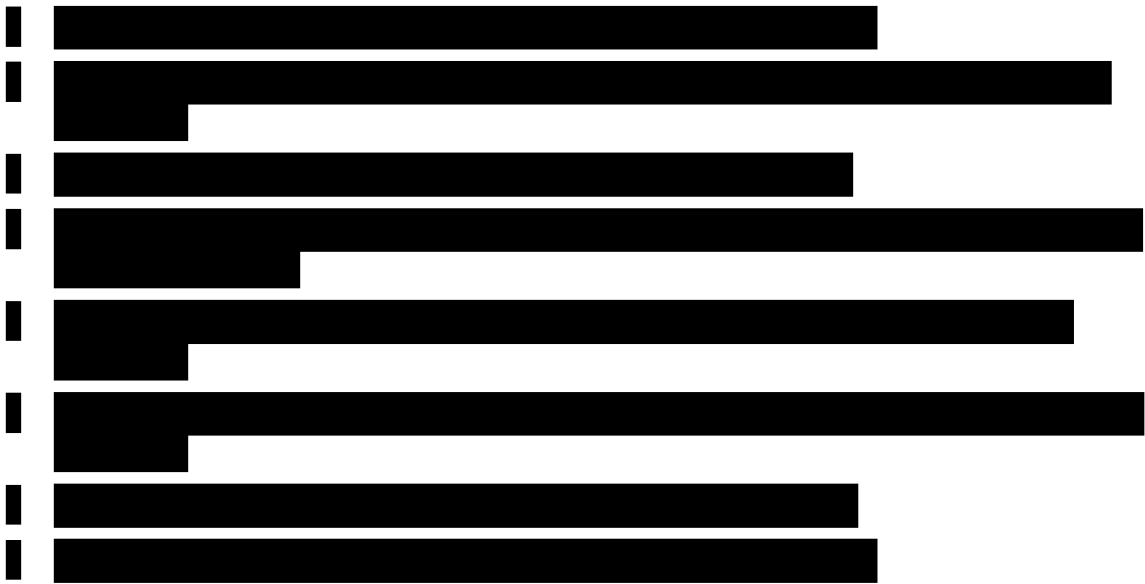
2.4.1 January Quarterly Sampling

The January/February 2017 quarterly sampling event included wells that were sampled as part of the quarterly well monitoring network in October and November 2016. The locations of these wells are as follows:



The January/February 2017 quarterly sampling event included the following category 1 and 2 wells whose combined PFOS and PFOA concentration exceeded the LHA level on their first sample. The locations of these wells are as follows:





The January/February 2017 quarterly sampling event included the following category 1 and 2 wells whose combined PFOS and PFOA concentration fell between 50 percent of the LHA level and the LHA. The locations of these wells are as follows:



The January/February 2017 quarterly sampling event also included the following locations of active wells adjacent to or near wells whose concentration exceeds 35 ng/L. The locations of these wells are as follows:



[REDACTED]

winterized in early September 2016:

- GHSA Hez Ray Sports Complex fields (no address), sample 593460-2: irrigation and drinking-water well, category 1

We did not sample the following well that meets the above-listed criteria, because freezing conditions prevented us from adequately treating the purge water using a portable GAC unit:

1 [REDACTED]

We did not sample the following wells that meet the above-listed criteria, because they declined sampling or were out of town for the wintertime. The locations of these wells are as follows:

- 1 [REDACTED]
- 1 [REDACTED]
- 1 [REDACTED]
- 1 [REDACTED]
- 1 [REDACTED]
- 1 [REDACTED]
- 1 [REDACTED]
- 1 [REDACTED]

2.4.2 April Quarterly Sampling

The April/May 2017 quarterly sampling event added the following wells to the quarterly well monitoring network:

- 1 [REDACTED]
- 1 [REDACTED]
- 1 [REDACTED]

Row	Bar Length (approx. % of total)
1	10
2	85
3	85
4	95
5	85
6	90
7	85
8	100
9	10
10	85
11	85
12	95
13	10
14	95
15	10

[REDACTED]

2.4.3 Changes to Quarterly Well Monitoring Network

Applying above-listed criteria, we plan to add the following wells to the quarterly well monitoring network beginning in July:

- MW-1701-13: groundwater MW installed down gradient of the RFTC burn pit in April 2017, 13 feet deep
- MW-1701-35: MW adjacent to MW-1701-13, 35 feet deep
- 3021 Davis Road, Building 1, PAN 515507: business rental and residential, category 1, within three commercial or industrial parcels from PAN 169048 but one parcel is 40 feet wide and properties are mixed use
- 3021 Davis Road, Building 2, PAN 515515: business and residential, Gas & Diesel Doctor, category 1, within two commercial or industrial parcels from PANs 167983 and 169048 but properties are mixed use

[REDACTED]

The following wells are not included in the quarterly well monitoring network:

- [REDACTED]
- [REDACTED]
- [REDACTED]

2.5 Sample Custody, Storage, and Transport

Immediately after collection, the sample jars for each location were placed in a Ziploc bags and stored in a designated sample cooler maintained between 0 °C and 6 °C with ice substitute. Exceptions due to delayed shipments are noted in individual laboratory reports. Shannon & Wilson maintained custody of the samples until submitting them to the laboratory for analysis. For shipping we packaged analytical samples and chain-of-custody (COC) forms in a hard plastic cooler with an adequate quantity of frozen ice substitute, packing material as necessary to prevent bottle breakage, and a laboratory-supplied liner bag. We applied Shannon & Wilson custody seals to the cooler, which were observed to be intact upon receipt by the laboratory.

We shipped sample coolers to TestAmerica in West Sacramento, California using FedEx priority overnight service. This allowed sufficient time for the laboratory to analyze the samples within holding-time requirements of the analytical method. The complete TestAmerica laboratory reports (WOs 23633, 23892, 24461, 25170, 25173, 25288, 25707, 25710, 27373, 27604, 27605, 28113, 28115, 28375, 28929, and 29312) are included in Appendix E.

2.6 Notification of Results

Upon completion of review of the analytical data, we prepared letters to owners and occupants informing them of the results for the sample from their well. These letters were tailored to each property and analytical sample, and included the following information:

- sample name;
- analytical result for PFOS and PFOA;
- comparison of analytical results to the LHA level;

- description of the project;
- those pages of the TestAmerica laboratory report that apply to the owner or occupant's water-well sample;
- an updated CoF fact sheet; and
- an updated regional results map.

When requested, results letters were e-mailed to owners or occupants instead of mailed in hard copy. We also contacted some owners and occupants via telephone to notify them of their results prior to letter preparation. At a minimum, we contacted the owners of those properties whose results exceeded the LHA level, and those who requested to be notified immediately.

2.7 Alternative Water Sources

The CoF has offered bottled water deliveries at no cost to owners and occupants whose category 1 or 2 well water exceeds the LHA level, until they are provided with a long-term alternate water source. Deliveries are ongoing, and are being coordinated by Andrew Ackerman of the CoF and Jim Mason of Spring Alaska.

Bottled water recipients are listed in Appendix F; this list excludes MWs and the three category 3 wells whose PFC concentrations exceed the LHA level (samples 536555-4, 536555-5, and 168246). Please note that Appendix F includes properties where water deliveries have been discontinued because a water treatment system was installed or they have been connected to the municipal water system. A GAC system was installed by Arctic Home Living at 3350 Holden Road on December 14, 2016, and seven homes on 30th Avenue have been connected to the municipal water system. One of the homes connected to the municipal water system in 2016 had a well-water concentration below the LHA level (PAN 87190). The CoF plans to connect 31 additional homes and businesses with category 1 and 2 wells whose concentrations exceed the LHA level to the municipal water system in 2017. These locations are listed in Section 2.3, Quarterly Well Monitoring Network.

2.8 Public Information

The ADEC Contaminated Sites Program continues to host a webpage summarizing the RFTC project history and goals. The webpage includes a simplified regional results map depicting private well, MW, and surface-water sample locations with respect to the LHA level. This map is updated periodically following the receipt of analytical data.

On November 17, 2016 the CoF hosted a community meeting in the City Council Chambers at 800 Cushman Street. At the request of the CoF we prepared and mailed or emailed meeting

invitations and fact sheets to the owners and/or occupants of properties whose wells we had sampled to date in Areas 1 through 8. Where previous contact had included both owners (i.e., landlords) and occupants (i.e., tenants) we will send the meeting invitation to more than one address per sample location.

The Alaska Department of Health and Social Services (DHSS) Section of Epidemiology prepared an updated health fact sheet for the community meeting describing the health effects associated with exposure to PFOS and PFOA. The DHSS fact sheet refers to PFCs as perfluoroalkyl substances (PFAS); they are considered equivalent. The fact sheet was distributed to owners and occupants who attended the meeting, and mailed or emailed to most owners and/or occupants of properties whose wells we had sampled to date on November 21. The meeting invitation and DHSS fact sheet mailer are included in Appendix A, in addition to other communication with owners and occupants.

2.9 Deviations

In general, we conducted our services in accordance with the approved proposals. The following are the deviations from our agreed-upon scope of services.

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- Our proposals dated December 16, 2016 called for sampling 48 wells as part of the quarterly well monitoring network in January. Our proposal dated March 17, 2017 called for sampling 26 wells as part of the quarterly network in April. We did not sample each of these wells for reasons included in Section 2.3, Quarterly Well Monitoring Network.
- Our proposals dated January 18 and March 17, 2017 called for sampling *MW-301D* or *MW-301S*, Chevron MWs located near the intersection of Geist Road and Fairbanks Street. *MW-301D* was sampled as an outlier well on October 18, 2016. The MW owner did not grant us permission to sample these wells in spring 2017.

- For private wells we typically prepare letters to owners and occupants informing them of the results for the sample from their well. We did not prepare a result letter for sample 483826, collected from the well at [REDACTED]

3.0 ANALYTICAL RESULTS

We submitted analytical water samples to TestAmerica for determination of PFCs using Method WS-LC-0025, the laboratory's in-house method. This method analyzes for PFOS, PFOA, and the four other PFCs listed in the UCMR. We submitted first-time private well and MW samples in November 2016 to June 2017 for determination of the six UCMR PFCs. We submitted quarterly well monitoring network samples in January/February and April/May for PFOS and PFOA only.

The TestAmerica laboratory reports and ADEC Laboratory Data Review Checklists for each work order (WO) are included in Appendix E, listed in chronological order (WOs 23633, 23892, 24461, 25170, 25173, 25288, 25707, 25710, 27373, 27604, 27605, 28113, 28115, 28375, 28929, and 29312).

Analytical results and other relevant information for most private wells first sampled during the time period covered in this report are included in Figures 5 through 7, PANs, POFS and PFOA Results, and Well Depths. Note that Figure 5 includes previous well searches areas, where some samples were collected prior to November 2016. The onsite RFTC classroom building well (sample 483826) is not included in Figure 5. Figures 8 and 9 depict private well and MW sample locations to date where the LHA combined concentration exceeds the effective LHA level of 65 ng/L.

3.1 November 2016 Samples

Table 6 summarizes the concentrations of PFCs in November private well samples (WOs 23633 and 23892). There were no field-duplicate samples submitted with these WOs. The analytical results for two private well samples exceed the LHA level. [REDACTED]

[REDACTED] Please note that sample 95630 was collected in November, but is included with the October quarterly well monitoring network results in a previous report.

3.2 December 2016 Samples

Table 7 summarizes the concentrations of PFCs in the two water samples collected in December (WO 24461). There were no field-duplicate samples submitted with this WO. Included in Table

7 are private well samples *168106* and *168688*, and the first post-treatment confirmation sample collected from the outlet of the GAC filtration system installed at 3350 Holden Road (sample *407429-D*). Sample *168688* was collected in January. The analytical results for wells included in Table 7 do not exceed the LHA level.

3.3 January 2017 Samples

Table 7 summarizes the concentrations of PFCs in the one first-time private well sample collected in January (WO 25170). There were no field-duplicate samples submitted with this WO. Table 8, Summary of January and February 2017 Quarterly Resample Analytical Results, summarizes the concentrations of PFCs in wells sampled multiple times as part of the quarterly well monitoring network. Sample *168371* is a field duplicate of sample *168271*, sample *168613* is a field duplicate of sample *168513*, sample number *87508* is a field duplicate of sample *87408*, and *168923* is a field duplicate of sample *168823*. Sample *407429* was collected in February.

The analytical results for 20 quarterly well samples included in Table 8 exceed the LHA level.

3.4 February 2017 Samples

Table 8 summarizes the concentrations of PFCs in the one quarterly well sample collected in February (WO 25710). Table 9 summarizes the concentrations of PFCs in other private well samples collected in February (WO 25707). There were no field-duplicate samples submitted with this WO. The analytical results in Table 9 do not exceed the LHA level.

Table 9 includes two water samples where no PFCs were detected above the reporting limit of 2.0 ng/L.

3.5 April 2017 Samples

Table 10, Summary of April and May 2017 Quarterly Resample Analytical Results, summarizes the concentrations of PFCs in wells sampled in as part of the quarterly well monitoring network (WOs 27373 and 27604). Sample *169199* is a field duplicate of *169099*, sample *167901* is a field duplicate of *167801*, and sample *87435* is a field duplicate of *87355*. Samples *593460-2* and *95630* were collected in May. The analytical results for four quarterly well samples exceed the

LHA level. [REDACTED]
[REDACTED]

Table 11, Summary of April to June 2017 Private Well Analytical Results, includes first-time private well samples collected in April (WO 27605). There were no field-duplicate samples submitted with this WO. The analytical results for samples *168963-1* and *168963-2*, the two samples collected in April, both exceeded the LHA level. The highest of these results was 160 ng/L PFOS and 18 ng/L PFOA in sample *168963-1*, the well located at 2509 Alston Road.

3.6 May 2017 Samples

Table 10 summarizes the concentrations of PFCs in the two quarterly well samples collected in May (WOs 28115 and 28375). There were no field-duplicate samples submitted with this WO. Table 11 summarizes the concentrations of PFCs in other private well samples collected in May (WOs 28113 and 28375). There were no field-duplicate samples submitted with these WOs. Samples *167860*, *263184*, and *267198* were collected in May. The analytical results for these samples did not exceed the LHA level. The highest of these results was 20 ng/L PFOS and 4.4 ng/L PFOA in sample *167860*, the well located at [REDACTED]

3.7 June 2017 Samples

Table 11 summarizes the concentrations of PFCs in private well samples collected in June (WOs 28929 and 29312). WO 28929 did not contain a field-duplicate sample. In WO 29312, sample *483926* is a field duplicate of sample *483826*. Samples *167878*, *168246*, *483826*, and *483926* were collected in June. The analytical results for one of these samples exceeded the LHA level. This results was 66 ng/L PFOS and 41 ng/L PFOA in sample *168246*, the well located at [REDACTED]
[REDACTED]

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) procedures assist in producing data of acceptable quality and reliability. We reviewed the analytical results for laboratory QC samples and also conducted our own QA assessment for this project. We reviewed the COC records and laboratory-receipt forms to check that custody was not breached, sample holding-times were met, and the samples were properly handled from the point of collection through analysis by the laboratory. Our QA review procedures allowed us to document the accuracy and precision of the analytical data, as well as check the analyses were sufficiently sensitive to detect analytes at levels below regulatory standards.

The laboratory applies the letter ‘J’ to a detection less than the limit of quantitation but greater than the detection limit; this “flagged” datum is considered an estimated concentration. We reviewed the data using the current ADEC Laboratory Data Review Checklist and applied a standardized set of flags to any data brought into question during the review. During our QC review we applied flags indicating estimated data or analytical bias as applicable. There were no QA/QC errors that resulted in flags for PFOS or PFOA analytical data in the laboratory WOs discussed in this report.

We reviewed analytical sample results (TestAmerica WOs 23633, 23892, 24461, 25170, 25173, 25288, 25707, 25710, 27373, 27604, 27605, 28113, 28115, 28375, 28929, and 29312) for this project. The laboratory reports, including the case narratives describing the laboratory QA results in detail, along with completed ADEC data-review, are included in Appendix E. Laboratory QC procedures included evaluating surrogate recovery, performing continuing calibration checks, analyzing method blanks, and checking laboratory control samples to assess accuracy. Please refer to Appendix E for details regarding the results of our QA review for these 22 WOs.

By working in general accordance with our proposed scope of services, we consider the samples we collected for this project to be representative of site conditions at the locations and times they were obtained. Based on our QA review, no samples were rejected as unusable due to QC failures, and our completeness goal of obtaining 85 percent useable data was met. In general, the quality of the analytical data for this project does not appear to have been compromised by analytical irregularities and is adequate for the purposes of our assessment.

5.0 DISCUSSION

We present here our discussion relevant to the RFTC site, downgradient well search areas, and vicinity. Of the water samples discussed in this and previous reports, there are 40 private well, four MW, and two surface-water sample locations with LHA combined concentrations exceeding the effective LHA level of 65 ng/L (Figures 8 and 9). Of the 40 private well exceedances, 32 are category 1 wells, five are category 2 wells, one is a category 3 well, and two are category 4 wells. Eight of these private wells are located in Area 1, either on 30th Avenue to the west of the intersection with North Van Horn Court or directly northwest of the RFTC in the FNSB Davis Fields area. Two of these MWs are located on the RFTC property in Area 1. Two of these private wells and two MWs are located directly northwest of the RFTC in Areas 2 and 3.

The highest concentration of private well exceedances is in the vicinity of Davis Road, Hill Road, and Alston Road to the west-northwest of the RFTC (Areas 5 and 8, Figure 9). Area 5 contains 27 private well exceedances, while Area 8 contains three. The two surface-water sample exceedances are from gravel pit lakes on Picket Place in or adjoining Area 5 (sampled October

18, 2016, and previously reported). These analytical results are summarized in Figures 5 through 9 and Figure 13. The CoF has offered an alternate water source or sources to homes and businesses with category 1 and 2 wells where concentrations exceed the LHA level (Section 2.6).

5.1 Quarterly Trend Analysis

We assessed temporal data for select quarterly well monitoring network locations using the Mann-Kendall nonparametric trend analysis at a 95% confidence level (Gilbert, 1987). This test requires data from a minimum of four sampling events to assess concentration trends; nine sample locations met this criterion. We performed the test on PFOS and PFOA results using the EPA's Statistical Software ProUCL.

The trend analysis found increasing PFOA concentrations with time for samples 87408, 87335, 87319, and 87301, each from wells located on Van Horn Court or North Van Horn Road in Area 1. The analysis did not encounter statistically significant trends in PFOS concentrations for these samples, or trends in PFOS or PFOA concentrations for the other five samples (92924, 669077, MW-507, 167754, and 95630). A no-trend determination does not necessarily equate to a stable groundwater contaminant plume; rather, it indicates a lack of discernable up or down trend.

If seasonal variation in PFC concentrations exists, it would not be identified as part of a standard Mann-Kendall analysis. We have sampled some quarterly network wells for four consecutive sampling quarterly events (i.e., July, October, January, and April). For these locations, the springtime sample typically has the highest PFOS and LHA combined results. However, a statistical evaluation of seasonal trends requires multiple analytical results for each season.

Table 12, Comparison of Quarterly Analytical Results, compares the PFOS, PFOA, and LHA combined results for each quarterly well monitoring network sample location. Figures 10 through 12 depict the LHA combined result for these sample locations. Samples MW-507, 127124, 167631, 407411, and 168831 are noteworthy in that the PFOS, PFOA, or LHA combined concentration varied by greater than or equal to 100-percent between one or more consecutive sampling events. Please note that bar graphs are scaled for comparison of results within each sample location. Wells that were first sampled after July 2016 are included with the quarterly well monitoring network samples for the same date range. For example, many wells in Area 5 were first sampled in August or September 2016; these results are displayed with the July 2016 quarterly samples.

5.2 Concentrations with Depth

As part of our private well search we collected data on well depth and the presence or absence of permafrost, where known. Well depth is considered known for approximately 50 percent and estimated for approximately 25 percent of the private wells and MWs tested to date. Please note that in most cases well depths are reported by owners, occupants, or developers.

We have prepared two northwest-southeast trending cross-sections depicting LHA combined concentration with depth. The cross-sections run parallel to the regional groundwater flow direction, and include private and MWs with known or estimated well depths sampled to date (Figure 13, Profile Locations and Groundwater Contours). Section A-A' extends from 0.7 mile southeast of the RFTC to three miles northwest of the site; the location is unchanged from our November report (Figure 14). Section B-B' has been extended to the northwest to include Areas 9 and 10, and now extends from the intersection of Peger Road and the Mitchell Expressway to approximately 2.5 miles northwest (Figure 15).

Section A-A' includes sample locations that are within 1,500 feet of the section line north of the Mitchell Expressway and locations within 3,000 feet of the section line south of the Mitchell Expressway (i.e., search radius), in order to display information obtained from wells near the intersection of Peger and North Van Horn Roads. Section B-B' includes sample locations that are within 1,000 feet of the section line, including private wells on Picket Place, Davis Road, Hill Road, and Alston Road.

We observe that locations displayed in Section B-B' wells whose depths are less than or equal to 45 feet bgs appear more likely to have concentrations about the LHA. Analytical data for private wells collected since November 2016 confirms this conclusion. We do not observe clear trends with depth for locations displayed in Section A-A'.

6.0 RECOMMENDATIONS

Beginning in January 2016 we have worked on behalf of the CoF to identify and sample private wells near and downgradient of the RFTC. The well search effort has expanded iteratively in response to PFOS and PFOA concentrations in offsite private and MWs. In coordination with the CoF and ADEC, we have determined that the current extent of the well search and sample area (i.e., Areas 1 through 10) appears to encompass the downgradient extent of LHA combined concentrations greater than or equal to 35 ng/L, or 50-percent of the LHA level, in private wells.

We have not encountered LHA combined concentrations greater than or equal to 35 ng/L in Area 10. We therefore recommend that the ongoing sampling effort focus on Areas 1 through 9.

Within Area 1 through 9 we have sampled each identified, active category 1 or 2 well that we have received permission to sample. Although we will continue to follow up with some properties where well status is unknown, we consider the well search effort to be complete.

Based on our understanding of offsite private well data from November 2016 through June 2017, Shannon & Wilson offers the following recommendations:

- continue to sample wells in the quarterly well monitoring network in accordance with established criteria for a minimum of one year, as discussed in Section 2.3, Quarterly Well Monitoring Network;
- continue to provide an interim alternate water source or sources to the occupants of homes or businesses with category 1 wells whose well water exceeds the LHA level;
- continue to implement the current plan of connecting homes or businesses with category 1 and 2 wells whose well water exceeds the LHA level to the municipal water system as a permanent alternate water source;
- continue to work with the ADEC and DHSS to educate the public regarding the potential health effects of exposure to PFOS- and PFOA-containing water;
- decommission the RFTC burn pit; and
- install offsite groundwater MWs to study groundwater flow directions, the presence of permafrost, and assess the lateral and vertical extent of the PFOS and PFOA groundwater plume.

Our recommendations are based on:

- Offsite groundwater conditions inferred through private well and MW analytical water samples collected from November 15, 2016 through June 20, 2017.
- The results of testing performed on water samples we collected from the private wells and MWs on, near, and downgradient from the CoF's RFTC property.
- Our previous experience in offsite well search Areas 1 through 8 downgradient from the RFTC, and site and subsurface conditions we observed during our onsite RFTC investigations, as they existed during September 2014 and December 2016.
- Our understanding of the project and information provided by the CoF, Fairbanks Fire Department, and other members of the project team.
- The limitations of our approved scope, schedule, and budget described in our proposals 31-2-16864-014 through -017, dated November 8, 2016 through March 17, 2017.

The information included in this report is based on limited sampling and should be considered representative of the time and location at which the sampling occurred. Regulatory agencies may reach different conclusions than Shannon & Wilson. We have prepared and included in the

Appendix G, “*Important Information about your Geotechnical/Environmental Report,*” to assist you and others in understanding the use and limitations of this report.

7.0 REFERENCES

- Alaska Department of Environmental Conservation (ADEC), 2016, 18 AAC 75: Oil and other hazardous substances pollution control: Juneau, Alaska, November, available: <http://dec.alaska.gov/commish/regulations/>.
- Alaska Department of Environmental Conservation (ADEC), 2016, 18 AAC 75.341 Table A2, Method One – *Petroleum Hydrocarbon Soil Cleanup Levels in the Arctic Zone* and Table B1, Method Two – *Arctic Zone Soil Cleanup Levels*.
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- Geomega Inc., 2012, North Pole Refinery site characterization: appendix Q – groundwater model: Boulder, Colo., Geomega, Inc., July 5.
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- Nelson, G. L., 1978, Hydrologic information for land-use planning; Fairbanks vicinity, Alaska: U.S. Geological Survey Open-File Report 78-959, 69 p.

TABLE 4
AREA 9 WELL SEARCH RESULTS

Note: This table contains personal information and is not intended for public distribution.

SHANNON & WILSON, INC.

This table contains personal information of resident in the search area. Content has been removed for confidentiality.

TABLE 5
AREA 10 WELL SEARCH RESULTS

Note: This table contains personal information and is not intended for public distribution.

SHANNON & WILSON, INC.

This table contains personal information of resident in the search area. Content has been removed for confidentiality.

TABLE 6
SUMMARY OF NOVEMBER 2016 PRIVATE WELL ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	168157	168378	168386	168491	168645	569356	167487
Perfluoroheptanoic Acid (PFHpA)	—	ng/L	2.0	1.3 J	1.2 J	6.0	5.6	0.88 J	<2.0
Perfluorooctanoic Acid (PFOA)	70†	ng/L	5.1	5.3	5.2	29	10	2.9	0.87 J
Perfluorononanoic Acid (PFNA)	—	ng/L	<2.0	<2.0	<2.0	<2.0	0.85 J	<2.0	<2.0
Perfluorobutanesulfonic Acid (PFBS)	—	ng/L	4.6	5.9	5.9	14.0	8.3	3.1	0.94 J
Perfluorohexanesulfonic Acid (PFHxS)	—	ng/L	22	24	24	63	39	14	4.1
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	14	24	34	130	94	17	1.4 J
LHA Combined (PFOS + PFOA)	70†	ng/L	19	29	39	159	104	20	2.3

ng/L nanograms per liter
 EPA Environmental Protection Agency
 LHA Lifetime Health Advisory
 † EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ng/L.
 — EPA LHA level not established
Bold Concentration exceeds EPA LHA level
 < Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
 J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.

TABLE 7
SUMMARY OF DECEMBER 2016 AND JANUARY 2017 PRIVATE WELL ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	168106 1957 University Ave	407429-D 3350 Holden Rd	168688 2375 University Ave
Perfluoroheptanoic Acid (PFHpA)	—	ng/L	2.2	--	1.5 J
Perfluorooctanoic Acid (PFOA)	70 [†]	ng/L	5.0	<2.0	3.3
Perfluorononanoic Acid (PFNA)	—	ng/L	<2.0	--	<2.0
Perfluorobutanesulfonic Acid (PFBS)	—	ng/L	3.4	--	1.5 J
Perfluorohexanesulfonic Acid (PFHxS)	—	ng/L	20	--	4.8
Perfluorooctane Sulfonate (PFOS)	70 [†]	ng/L	7.7	<2.0	3.7
LHA Combined (PFOS + PFOA)	70 [†]	ng/L	13	<2.0	7.0

ng/L nanograms per liter

EPA Environmental Protection Agency

LHA Lifetime Health Advisory

† EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ng/L.

— EPA LHA level not established

-- Analytical sample not collected; parameter not required.

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

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

TABLE 8
SUMMARY OF JANUARY AND FEBRUARY 2017 QUARTERLY RESAMPLE ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	147486	167631	167754	167886	167967	167983	168173	168254	168271	168371	168378
Perfluorooctanoic Acid (PFOA)	70†	ng/L	23	12	11	16	37	16	2.5	29	28	31	4.8
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	250	71	51	150	56	29	20	55	260	250	21
LHA Combined (PFOS + PFOA)	70†	ng/L	273	83	62	166	93	45	23	84	288	281	26

Notes: Sample number 168371 is a field duplicate of sample 168271.
 ng/L nanograms per liter
 EPA Environmental Protection Agency
 LHA Lifetime Health Advisory
 † EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance, results are compared to 65 ng/L.
Bold Concentration exceeds EPA LHA level

TABLE 8
SUMMARY OF JANUARY AND FEBRUARY 2017 QUARTERLY RESAMPLE ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	168386	168432	168483	168491	168513	168613	168831	168874	168980	407411	515493-1
Perfluorooctanoic Acid (PFOA)	70†	ng/L	4.7	22	31	27	28	28	4.9	6.0	3.0	19	260
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	31	180	250	130	190	180	16	79	17	35	60
LHA Combined (PFOS + PFOA)	70†	ng/L	36	202	281	157	218	208	21	85	20	54	320

Notes: Sample number 168613 is a field duplicate of sample 168513.

ng/L nanograms per liter

EPA Environmental Protection Agency

LHA Lifetime Health Advisory

† EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ng/L

Bold Concentration exceeds EPA LHA level

TABLE 8
SUMMARY OF JANUARY AND FEBRUARY 2017 QUARTERLY RESAMPLE ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	515493-2	526576	669077	87301	87319	87335	87408	87508	92924	95630	167801
Perfluorooctanoic Acid (PFOA)	70†	ng/L	13	3.6	3.7	3.7	4.3	3.9	5.6	5.8	5.0	5.4	4.9
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	32	36	32	24	24	11	35	35	34	23	16
LHA Combined (PFOS + PFOA)	70†	ng/L	45	40	36	28	28	15	41	41	39	28	21

Notes: Sample number 87508 is a field duplicate of 87408.

ng/L nanograms per liter

EPA Environmental Protection Agency

LHA Lifetime Health Advisory

† EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ng/L.

Bold Concentration exceeds EPA LHA level

TABLE 8
SUMMARY OF JANUARY AND FEBRUARY 2017 QUARTERLY RESAMPLE ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	147460	168467	168564	168726	168823	168923	169048	537268	64751	407429
Perfluorooctanoic Acid (PFOA)	70†	ng/L	23	27	21	5.4	8.8	9.1	2.9	28	17	28
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	270	230	110	43	100	110	21	110	13	68
LHA Combined (PFOS + PFOA)	70†	ng/L	293	257	131	48	109	119	24	138	30	96

Notes: Sample number 168923 is a field duplicate of sample 168823.
 ng/L nanograms per liter
 EPA Environmental Protection Agency
 LHA Lifetime Health Advisory
 † EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ng/L
Bold Concentration exceeds EPA LHA level

TABLE 9
SUMMARY OF FEBRUARY 2017 PRIVATE WELL ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	260835	266311	267040	267309	267317	540331-1	553239	564681	655955
Perfluoroheptanoic Acid (PFHpA)	—	ng/L	<2.0	0.82J	<2.0	<2.0	<2.0	7.2	0.88 J	<2.0	<2.0
Perfluorooctanoic Acid (PFOA)	70†	ng/L	0.89 J	2.4	2.4	<2.0	<2.0	4.7	1.8 J	2.5	2.5
Perfluorononanoic Acid (PFNA)	—	ng/L	<2.0	<2.0	<2.0	<2.0	<2.0	1.3 J	<2.0	<2.0	<2.0
Perfluorobutanesulfonic Acid (PFBS)	—	ng/L	<2.0	<2.0	1.8J	<2.0	<2.0	2.8	1.7 J	1.9 J	1.8 J
Perfluorohexanesulfonic Acid (PFHxS)	—	ng/L	<2.0	2.4	4.8	<2.0	<2.0	14	4.1	5.7	3.9
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	<2.0	3.7	9.5	<2.0	<2.0	22	9.2	9.7	4.0
LHA Combined (PFOS + PFOA)	70†	ng/L	0.89 J	6.1	12	N/A	N/A	27	11	12	6.5

ng/L nanograms per liter

EPA Environmental Protection Agency

LHA Lifetime Health Advisory

† EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ng/L.

— EPA LHA level not established

— Analytical sample not collected; parameter not required.

Bold Concentration exceeds EPA LHA level

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

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

N/A Not applicable. PFOS and PFOA were not detected in the project sample. The LHA Combined could not be calculated.

TABLE 10
SUMMARY OF APRIL AND MAY 2017 QUARTERLY RESAMPLE ANALYTICAL RESULTS

			167754	168173	168378	168386	168688	168726	168980	169048	169099	169199	407411
Analyte	EPA LHA Level	Units											
Perfluorooctanoic Acid (PFOA)	70†	ng/L	56	24	29	39	3.3	51	16	23	110	110	42
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	12	2.7	5.6	5.4	3.8	6.2	2.6	3.0	93	94	23
LHA Combined (PFOS + PFOA)	70†	ng/L	68	27	35	44	7.1	57	19	26	203	204	65

Notes: Sample number 169199 is a field duplicate of sample 169099.
 ng/L nanograms per liter
 EPA Environmental Protection Agency
 LHA Lifetime Health Advisory
 † EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance, results are compared to 65 ng/L.
Bold Concentration exceeds EPA LHA level

TABLE 10
SUMMARY OF APRIL AND MAY 2017 QUARTERLY RESAMPLE ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	515485	515493-2	87301	87408	87335	87435	92924	167801	167901	167983	407429-D
													sample
Perfluorooctanoic Acid (PFOA)	70†	ng/L	29	37	28	37	13	13	36	3.7	3.4	17	<2.0
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	8.2	19	4.2	6.4	4.0	3.9	5.7	15	14	31	<2.0
LHA Combined (PFOS + PFOA)	70†	ng/L	37	56	32	43	17	17	42	19	17	48	<2.0

Notes: Sample number 167901 is a field duplicate of sample 167801. Sample number 87435 is the field duplicate of sample 87335.
 ng/L nanograms per liter
 EPA Environmental Protection Agency
 LHA Lifetime Health Advisory
 † EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance, results are compared to 65 ng/L.
 < Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.

TABLE 10
SUMMARY OF APRIL AND MAY 2017 QUARTERLY RESAMPLE ANALYTICAL RESULTS

			64751	669077	87319	MW-507	593460-2	95630
Analyte	EPA LHA Level	Units						
Perfluorooctanoic Acid (PFOA)	70†	ng/L	25	3.9	4.9	27	4.2	3.9
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	20	35	26	320	17	23
LHA Combined (PFOS + PFOA)	70†	ng/L	45	39	31	347	21	27

ng/L nanograms per liter
EPA Environmental Protection Agency
LHA Lifetime Health Advisory
DOT&PF Department of Transportation & Public Facilities
MW Monitoring well
† EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance, results are compared to 65 ng/L.
Bold Concentration exceeds EPA LHA level

TABLE 11
SUMMARY OF APRIL TO JUNE 2017 PRIVATE WELL ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	168963-1	168963-2	167860	263184	267198	167878	168246	483826	483926
											Ave
Perfluoroheptanoic Acid (PFHpA)	—	ng/L	12	12	2.2	1.4 J	<2.0	0.9 J	4.6	<2.0	<2.0
Perfluorooctanoic Acid (PFOA)	70†	ng/L	18	16	4.4	4.1	2.0	3.5	41	3.7	3.9
Perfluorononanoic Acid (PFNA)	—	ng/L	2.2	1.5 J	0.74 J	7.2	3.4	0.8 J	220	<2.0	<2.0
Perfluorobutanesulfonic Acid (PFBS)	—	ng/L	12	12	2.1	0.92 J	<2.0	<2.0	13	1.7 J	1.6 J
Perfluorohexanesulfonic Acid (PFHxS)	—	ng/L	51	52	11	3.9	1.7 J	8.1	38	8.0	8.2
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	160	140	20	3.9	1.9 J	18	66	3.9	3.9
LHA Combined (PFOS + PFOA)	70†	ng/L	178	156	24	8.0	3.9	22	107	7.6	7.8

Notes: Sample number 483926 is a field duplicate of sample 483826.

ng/L nanograms per liter

EPA Environmental Protection Agency

GHSA Golden Heart Softball Association

LHA Lifetime Health Advisory

† EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ng/L.

— EPA LHA level not established

Bold Concentration exceeds EPA LHA level

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

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

TABLE 12
COMPARISON OF QUARTERLY ANALYTICAL RESULTS










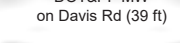












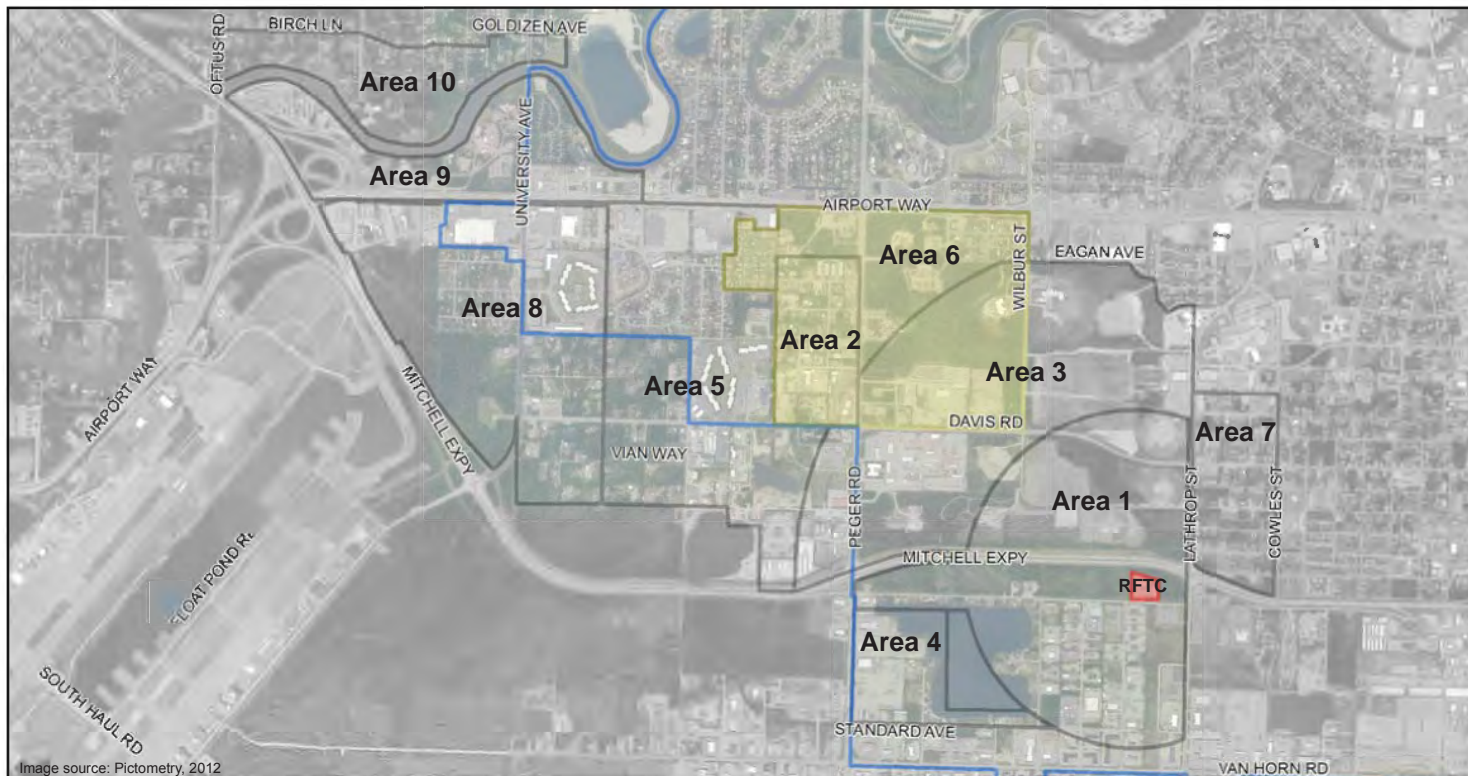
Sample Name	Sample Date	Sample Location	PFOA (ng/L)	PFOS (ng/L)	LHA Combined (PFOS+ PFOA)	Exceed LHA Level?†	Trend‡
92924	April-17		5.7	36	42	NO	No trends
	January-17		5.0	34	39		
	October-16		5.1	26	31		
	July-16		5.3	34	39		
	March-16		4.6	42	47		
87408	April-17		6.4	37	43	NO	Increasing PFOA, no trend in PFOS
	January-17		5.8	35	41		
	October-16		5.2	30	35		
	July-16		5.3	31	36		
	February-16		4.4	43	47		
87335	April-17		4.0	13	17	NO	Increasing PFOA, no trend in PFOS
	January-17		3.9	11	15		
	October-16		3.7	11	15		
	July-16		3.0	9.2	12		
	February-16		2.8	10	13		
87319	April-17		4.9	26	31	NO	Increasing PFOA, no trend in PFOS
	January-17		4.3	24	28		
	October-16		3.9	19	23		
	July-16		3.8	22	26		
	February-16		3.3	32	35		
87301	April-17		4.2	28	32	NO	Increasing PFOA, no trend in PFOS
	January-17		3.7	24	28		
	October-16		3.1	20	23		
	July-16		3.5	24	28		
	February-16		2.3	30	32		
669077	April-17		3.9	35	39	NO	No trends
	January-17		3.7	32	36		
	October-16		2.8 J*	20	23		
	July-16		3.5	32	36		
	March-16		3.9	35	39		
95630	May-17		3.9	23	27	NO	No trends
	January-17		5.4	23	28		
	November-16		3.6	18	22		
	July-16		3.4	19	22		
	May-16		4.2	17	21		
526576	January-17		3.6	36	40	YES to NO	Sample size too small
	October-16		3.4	33	36		
	April-16		3.4	65	68		
MW-507	April-17	DOT&PF MW on Davis Rd (39 ft)	27	320	347	YES	No trends
	October-16		23	160	183		
	July-16		23	200	223		
	November-15		21	63	84		
593460-2	May-17		4.2	17	21	NO	Sample size too small
	May-16		5.5	31	37		
515485	April-17		8.2	29	37	NO	Sample size too small
	October-16		8.0	25	33		
	May-16		6.1	24	30		
167754	April-17		12	56	68	NO to YES	No trends
	January-17		11	51	62		
	October-16		8.6	40	49		
	July-16		8.2	45	53		
	April-16		8.9	51	60		
127124	October-16		12	27	39	YES to NO	Sample size too small
	July-16		14	33	47		
	April-16		14	68	82		
515493-1	January-17		260	60	320	YES	Sample size too small
	August-16		290	78	368		
515493-2	April-17		19	37	56	NO	Sample size too small
	January-17		13	32	45		
	October-16		12	22	34		
167801	April-17		3.7	15	19	NO	Sample size too small
	January-17		4.9	16	21		
	August-16		3.7	19	23		
169099	April-17		94	110	204	YES	Sample size too small
	October-16		80	94	174		
167983	April-17		17	31	48	NO	Sample size too small
	January-17		16	29	45		
	August-16		20	41	61		
167967	January-17		37	56	93	YES	Sample size too small
	August-16		42	82	124		
167631	January-17		12	71	83	YES	Sample size too small
	August-16		27	62	89		
168980	April-17		2.6	16	19	NO	Sample size too small
	January-17		3.0	17	20		
	August-16		2.1	19	21		
147460	January-17		23	270	293	YES	Sample size too small
	October-16		22 J*	240	262		
167886	January-17		16	150	166	YES	Sample size too small
	September-16		19	170	189		

TABLE 12
COMPARISON OF QUARTERLY ANALYTICAL RESULTS

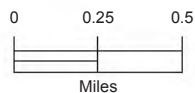
168254	January-17	[REDACTED]	29	55	84	YES	Sample size too small
	October-16		34	54	88		
147486	January-17	[REDACTED]	23	250	273	YES	Sample size too small
	August-16		26	290	316		
168432	January-17	[REDACTED]	22	180	202	YES	Sample size too small
	October-16		20 J*	150	170		
168467	January-17	[REDACTED]	27	230	257	YES	Sample size too small
	September-16		28	260	288		
168483	January-17	[REDACTED]	31	250	281	YES	Sample size too small
	August-16		42	300	342		
168491	January-17	[REDACTED]	27	130	157	YES	Sample size too small
	November-16		29	130	159		
168513	January-17	[REDACTED]	28	190	218	YES	Sample size too small
	August-16		34	230	264		
168564	January-17	[REDACTED]	21	110	131	YES	Sample size too small
	August-16		29	160	189		
169048	April-17	[REDACTED]	3.0	23	26	NO	Sample size too small
	January-17		2.9	21	24		
	August-16		3.0	35	38		
537268	January-17	[REDACTED]	28	110	138	YES	Sample size too small
	August-16		39	170	209		
407411	April-17	[REDACTED]	23	42	65	NO to YES	Sample size too small
	January-17		19	35	54		
	August-16		5.6	22	28		
168271	January-17	[REDACTED] d	31	260	291	YES	Sample size too small
	August-16		38	310	348		
407429	February-17	[REDACTED]	28	68	96	YES	Sample size too small
	September-16		31	96	127		
168726	April-17	[REDACTED]	6.2	51	57	NO	Sample size too small
	January-17		5.4	43	48		
	October-16		6.5	54	61		
168831	January-17	[REDACTED]	4.9	16	21	YES to NO	Sample size too small
	October-16		5.8 J*	87	93		
168874	January-17	[REDACTED]	6.0	79	85	YES	Sample size too small
	October-16		5.5 J*	63	69		
	April-17		2.7	24	27		
168173	January-17	[REDACTED]	2.5	20	23	NO	Sample size too small
	October-16		2.3 J*	17	19		
	January-17		9.1	110	119		
168823	October-16	[REDACTED]	10	110	120	YES	Sample size too small
	April-17		3.8	3.3	7.1		
168688	January-17	[REDACTED]	3.3	3.7	7.0	NO	Sample size too small
	April-17		5.4	39	44		
168386	January-17	[REDACTED]	4.7	31	36	NO	Sample size too small
	November-16		5.2	34	39		
	April-17		5.6	29	35		
168378	January-17	[REDACTED]	4.8	21	26	NO	Sample size too small
	November-16		5.3	24	29		
	April-17		25	20	45		
64751	January-17	[REDACTED]	17	13	30	NO	Sample size too small
	October-16		26	19	45		

Notes: For field-duplicate samples the higher of the two results is reported
 ng/L nanograms per liter
 LHA Lifetime Health Advisory
 † EPA LHA level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ng/L.
 ‡ Mann-Kendall trend analysis at a 95% confidence level was calculated using the EPA statistics software ProUCL Version 5.1
Bold Concentration exceeds EPA LHA level
 J* Estimated concentration, no direction of bias, flag applied by Shannon & Wilson.



LEGEND

- RFTC Site
- Ahtna Private Well Search Area
- CoF Boundary
- Well Search and Sampling Area



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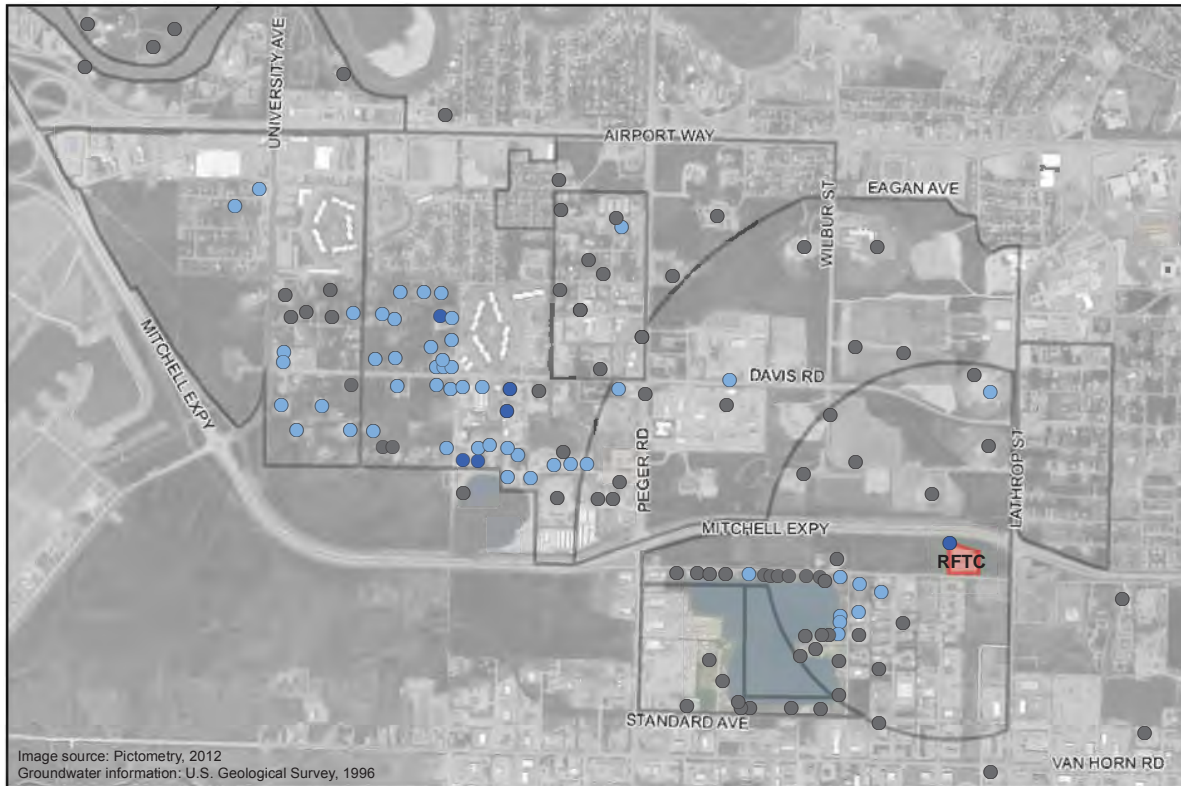
PRIVATE WELL SEARCH AND SAMPLE AREAS

July 2017

31-1-11735-008

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FIG. 1



LEGEND

Quarterly well monitoring network:

- Included in network (January or April)
- Add to network (future)
- Not included

RFTC Site

Well Search and Sampling Area

Approximate regional groundwater flow direction

0 0.25 0.5
Miles

N

Regional Fire Training Center
Fairbanks, Alaska

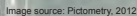
QUARTERLY WELL MONITORING NETWORK

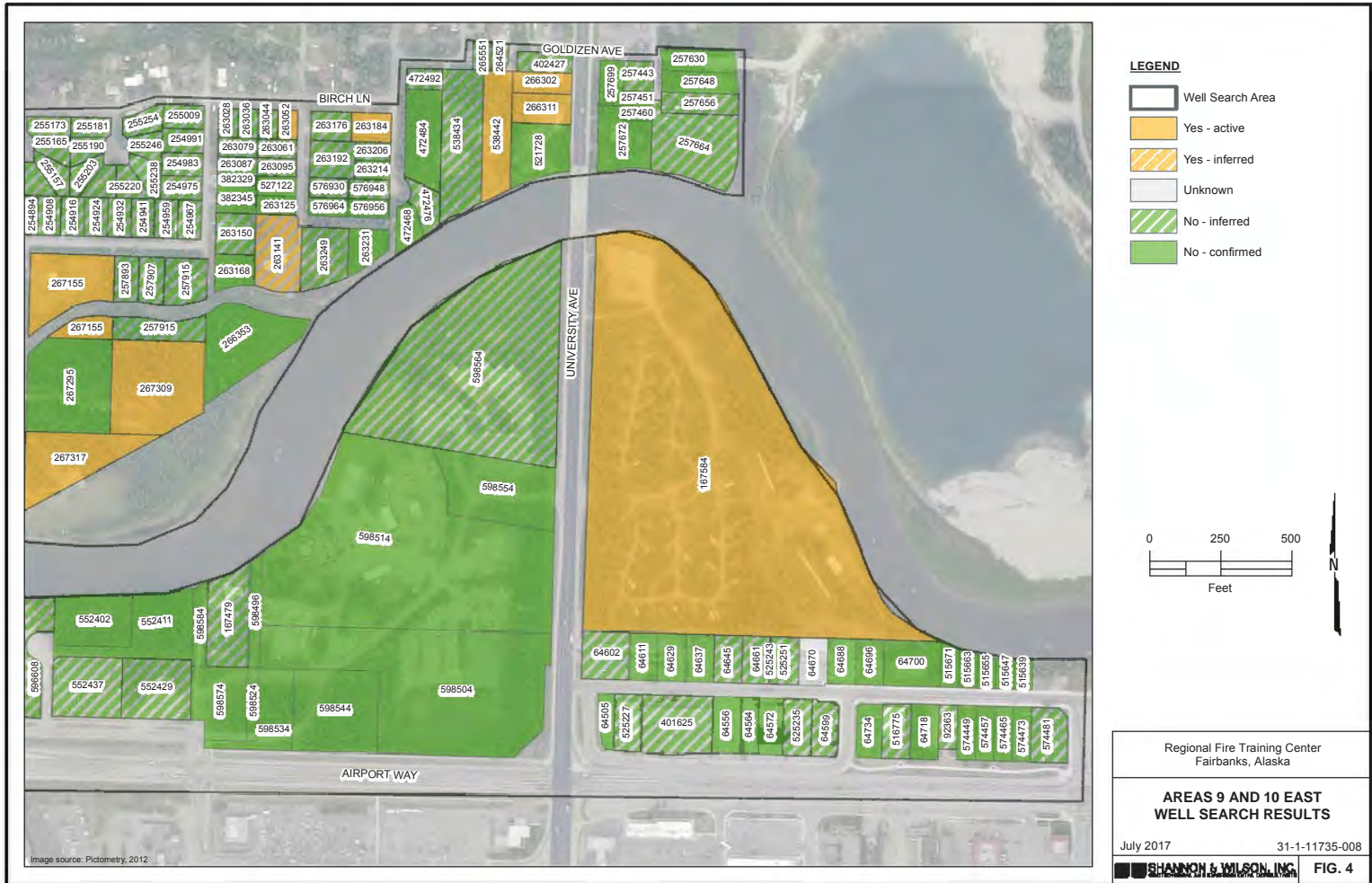
July 2017

31-1-11735-008

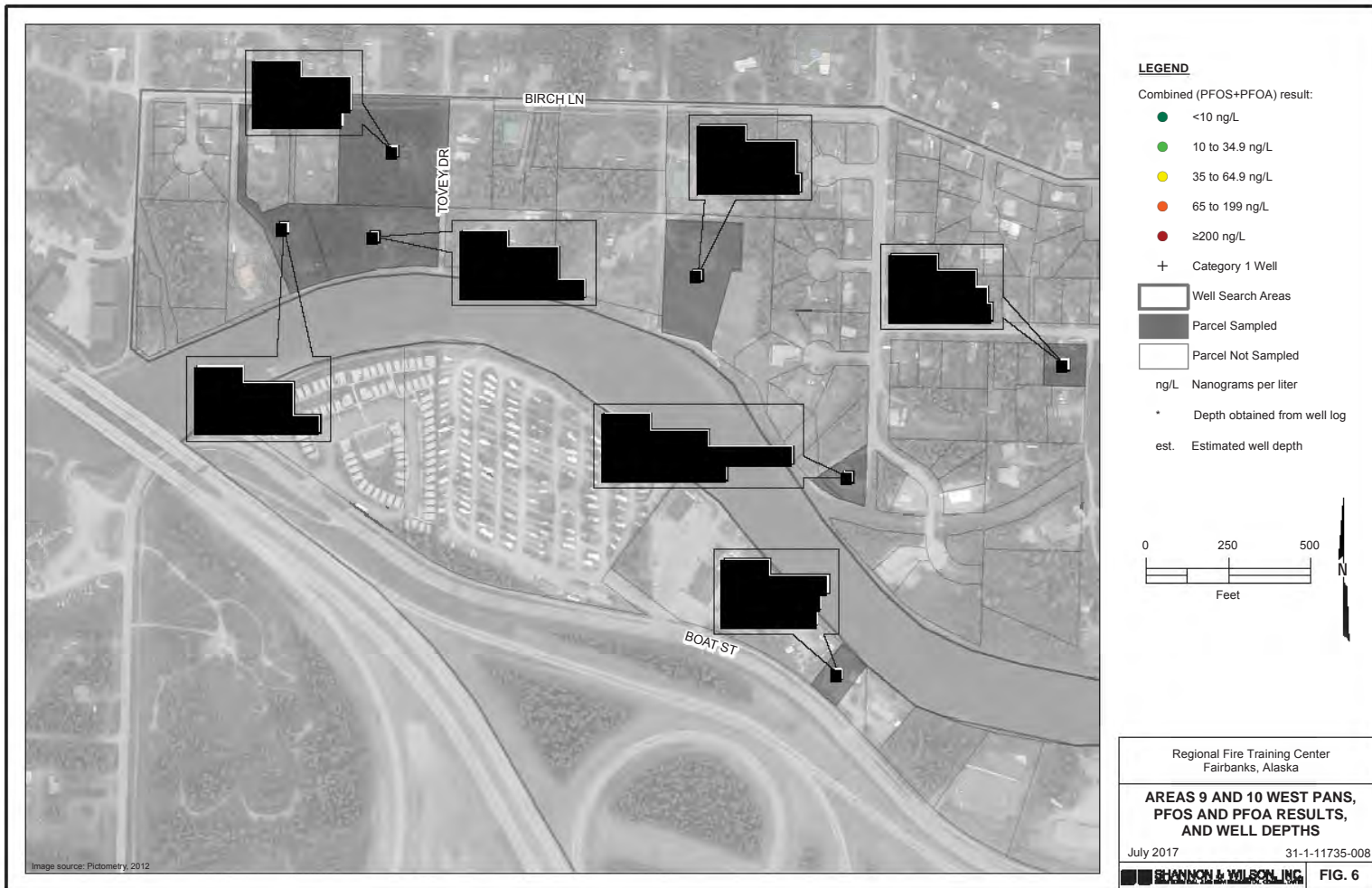
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FIG. 2









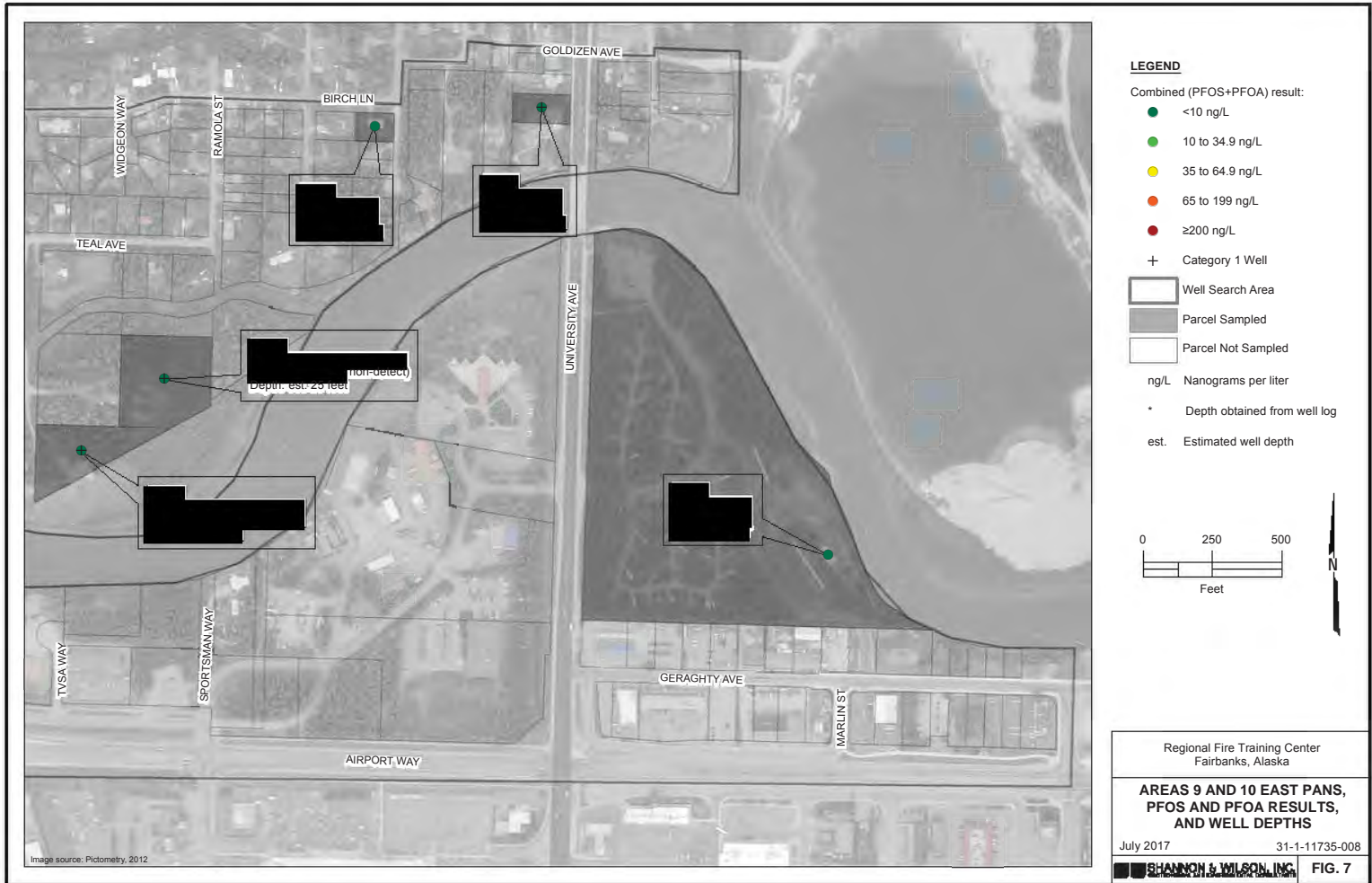


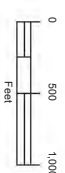


Image source: PhotoAir, 2012
Ground contour water information: U.S. Geological Survey, 1986. Groundwater elevations from July 16 and 17, 1987.

LEGEND
Combined (PFOS+PFOA) maximum
result for each sample location:

- 65 to 199 ng/L
- ≥200 ng/L
- + Category 1 Well
- Parcel with LHA level
exceedance
- Parcel without LHA level
exceedance
- RFTC Site

Sample Name
Address
Well Category
LHA Combined Result



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Fairbanks, Alaska

**AREAS 1, 2, 3, AND 5
LIFETIME HEALTH ADVISORY
LEVEL EXCEEDANCES**

July 2017 31-1-11735-008

SHANNON & WILSON, INC. FIG. 8



LEGEND

Combined (PFOS+PFOA) maximum result for each sample location:

● 65 to 199 ng/L

● ≥200 ng/L

+ Category 1 Well

■ Parcel with LHA level exceedance

□ Parcel without LHA level exceedance

■ RFTC Site

Sample Name
Address
Well Category
LHA Combined Result

0 250 500
Feet



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Fairbanks, Alaska

AREAS 5 AND 8 LIFETIME HEALTH ADVISORY LEVEL EXCEEDANCES

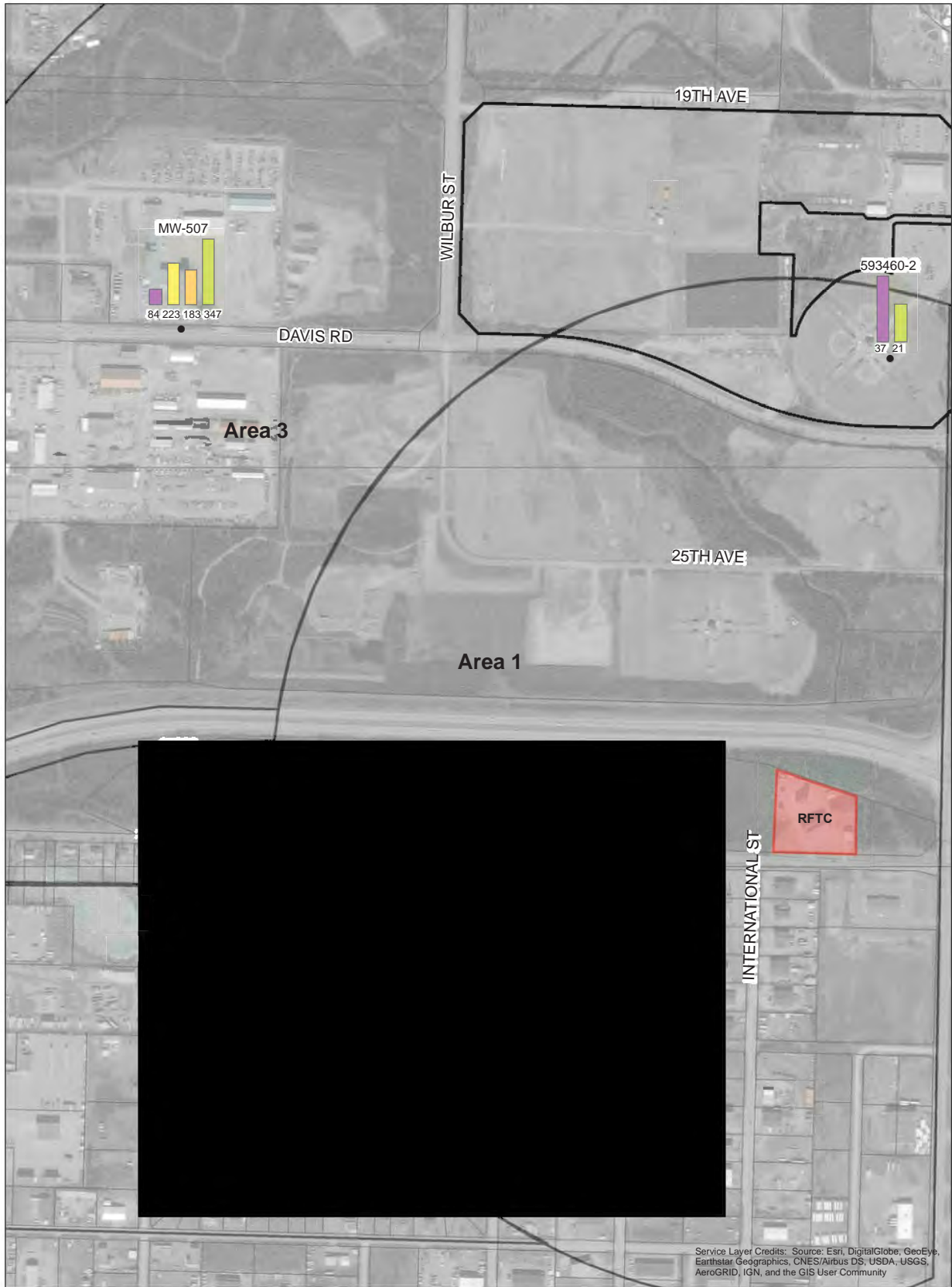
July 2017

31-1-11735-008

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FIG. 9

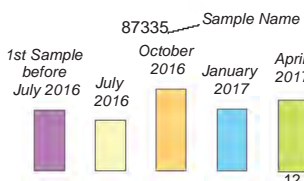
Image source: Pictometry, 2012.
Ground contour water information: U.S. Geological Survey, 1996. Groundwater elevations from July 16 and 17, 1987.



QUARTERLY RESULTS

LEGEND

- Sampled Parcels
- Other Parcels
- Well Search and Sampling Area
- RFTC Site



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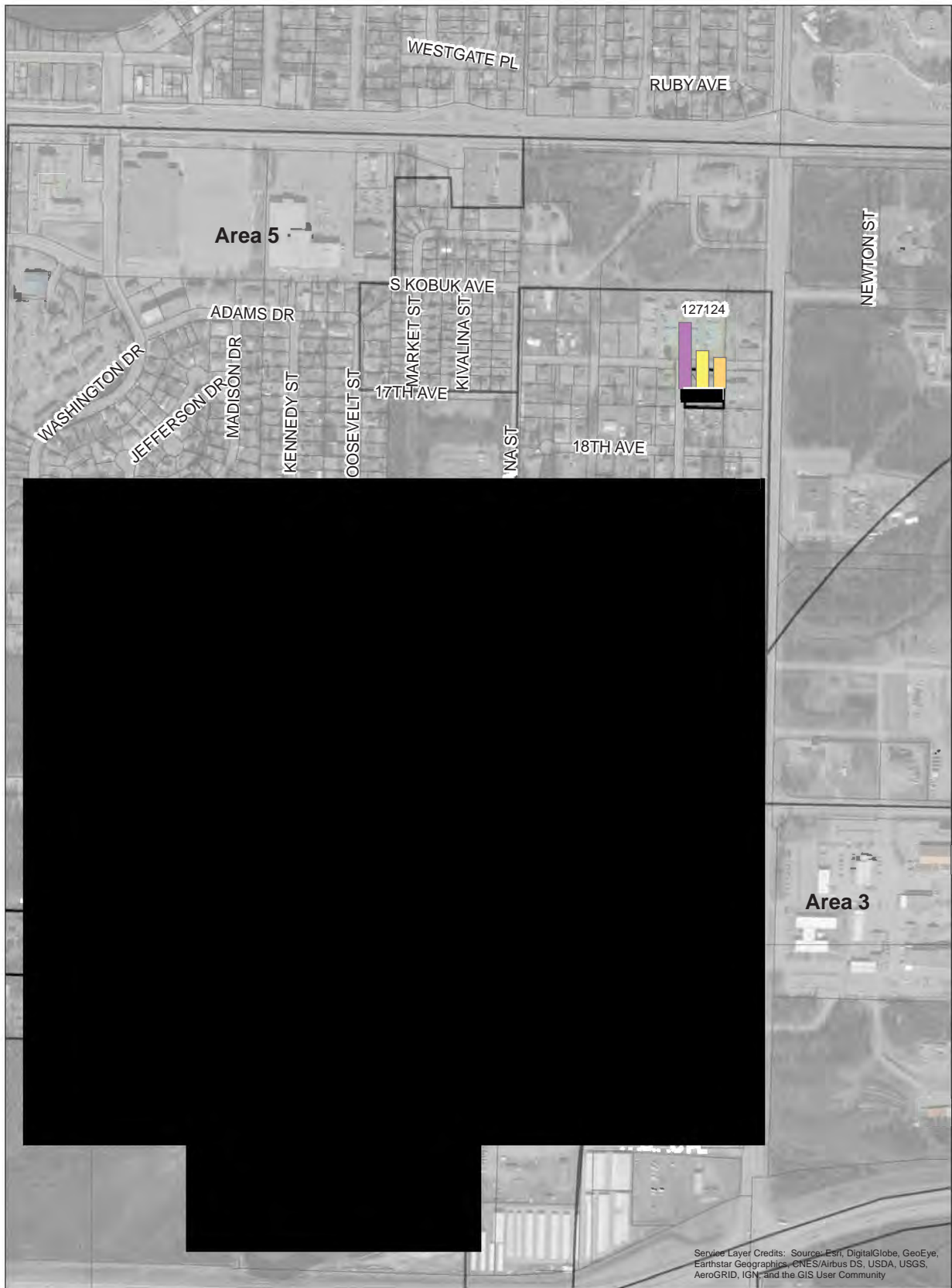
AREA 1 AND 3 QUARTERLY SAMPLING NETWORK RESULTS

July 2017

31-1-11735-008

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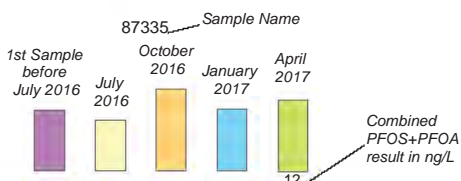
FIG. 10



QUARTERLY RESULTS

LEGEND

- Sampled Parcels
- Other Parcels
- Well Search and Sampling Area



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AREAS 2, 3, AND 5 QUARTERLY SAMPLING NETWORK RESULTS

July 2017

31-1-11735-008

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FIG. 11

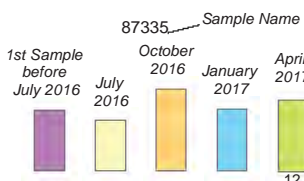


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QUARTERLY RESULTS

LEGEND

- Sampled Parcels
- Other Parcels
- Well Search and Sampling Area



Regional Fire Training Center
Fairbanks, Alaska

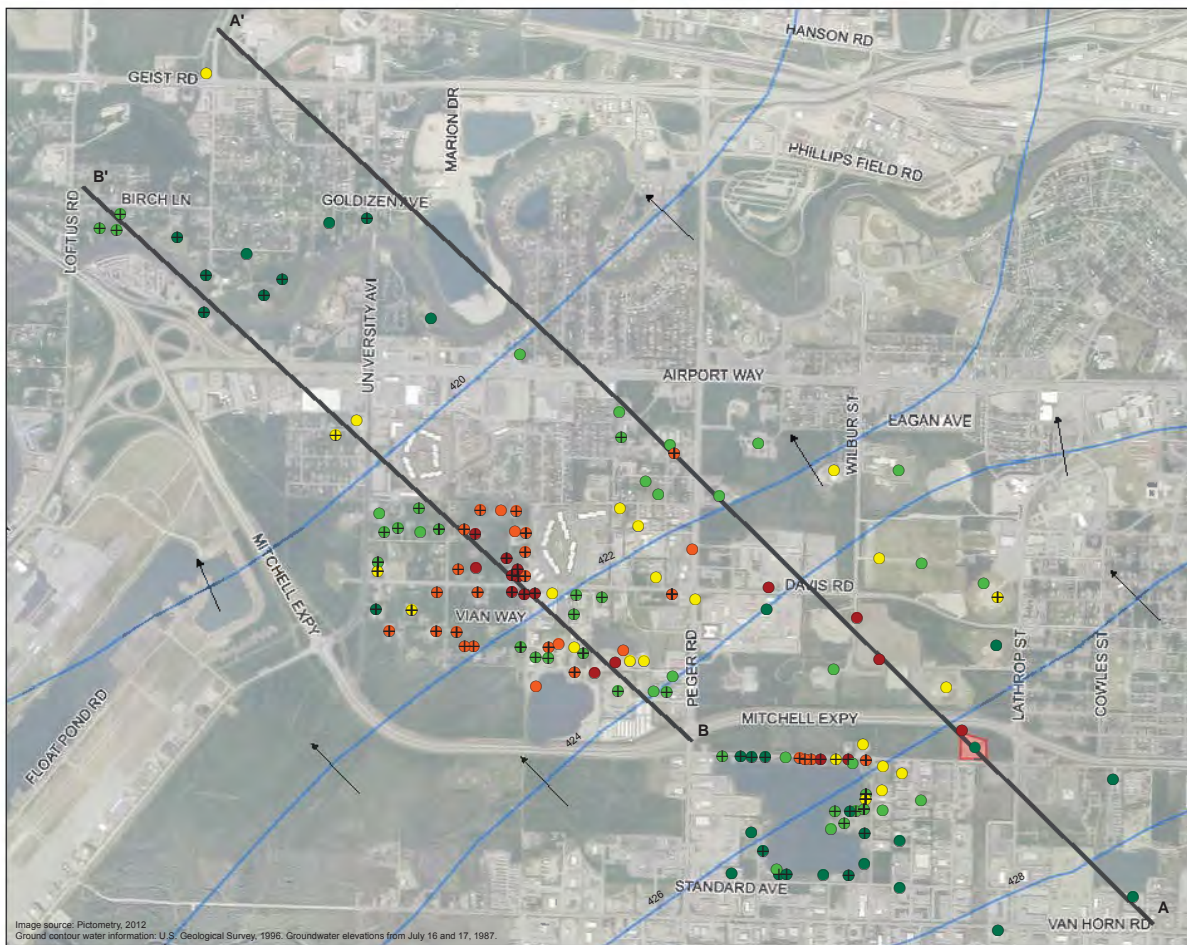
AREA 8 QUARTERLY SAMPLING NETWORK RESULTS

July 2017

31-1-11735-008

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 12



LEGEND

Combined (PFOS+PFOA) maximum result for each sample location:

- <10 ng/L
- 10 to 34.9 ng/L
- 35 to 64.9 ng/L
- 65 to 199 ng/L
- ≥200 ng/L
- + Category 1 Well

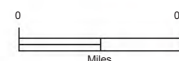
RFTC Site

Profile Location

Water table elevation contour in July 1987 (2-foot interval)

Approximate groundwater flow direction per contour

420 Groundwater elevation above sea level (feet)



Regional Fire Training Center
Fairbanks, Alaska

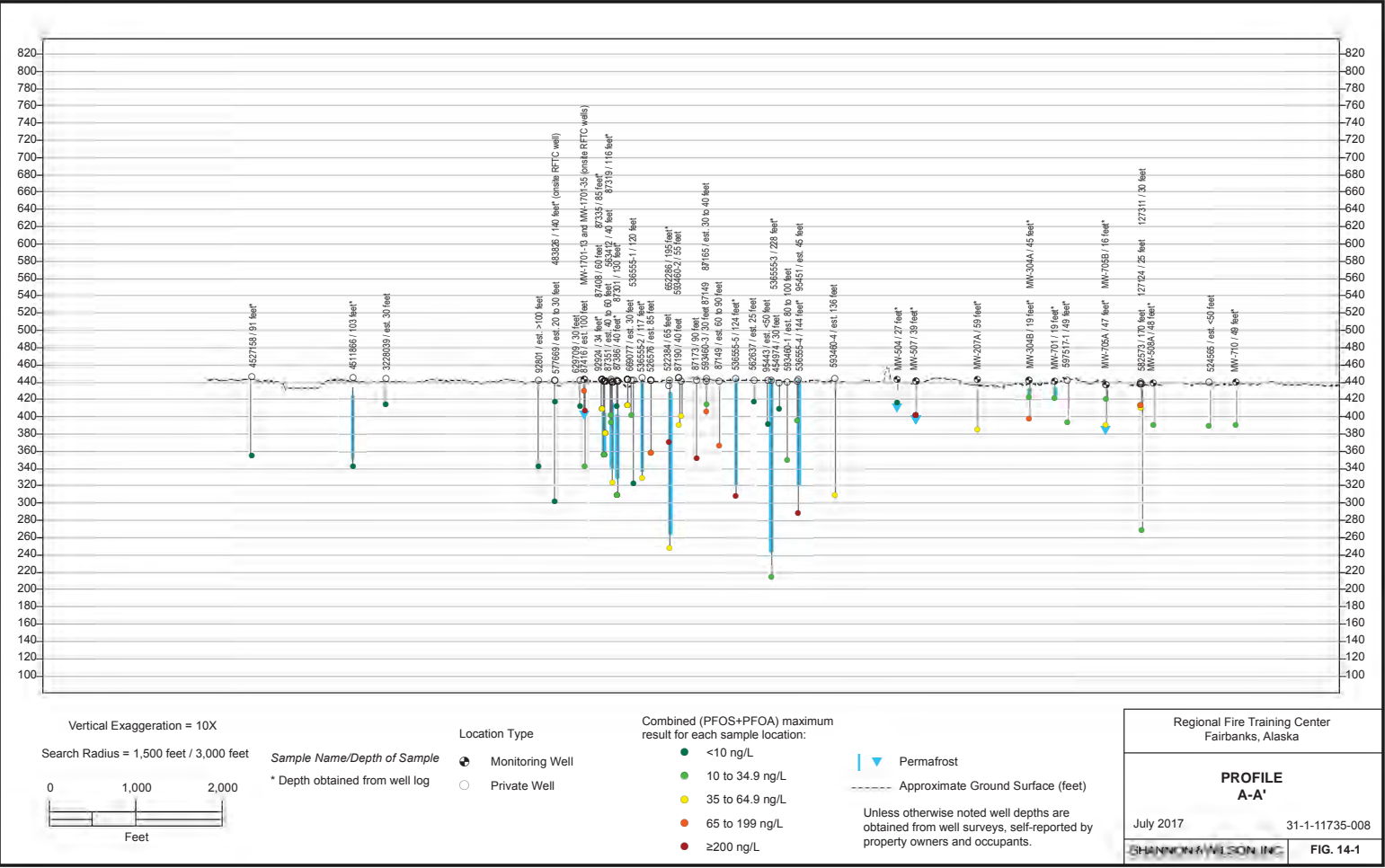
PROFILE LOCATIONS AND GROUNDWATER CONTOURS

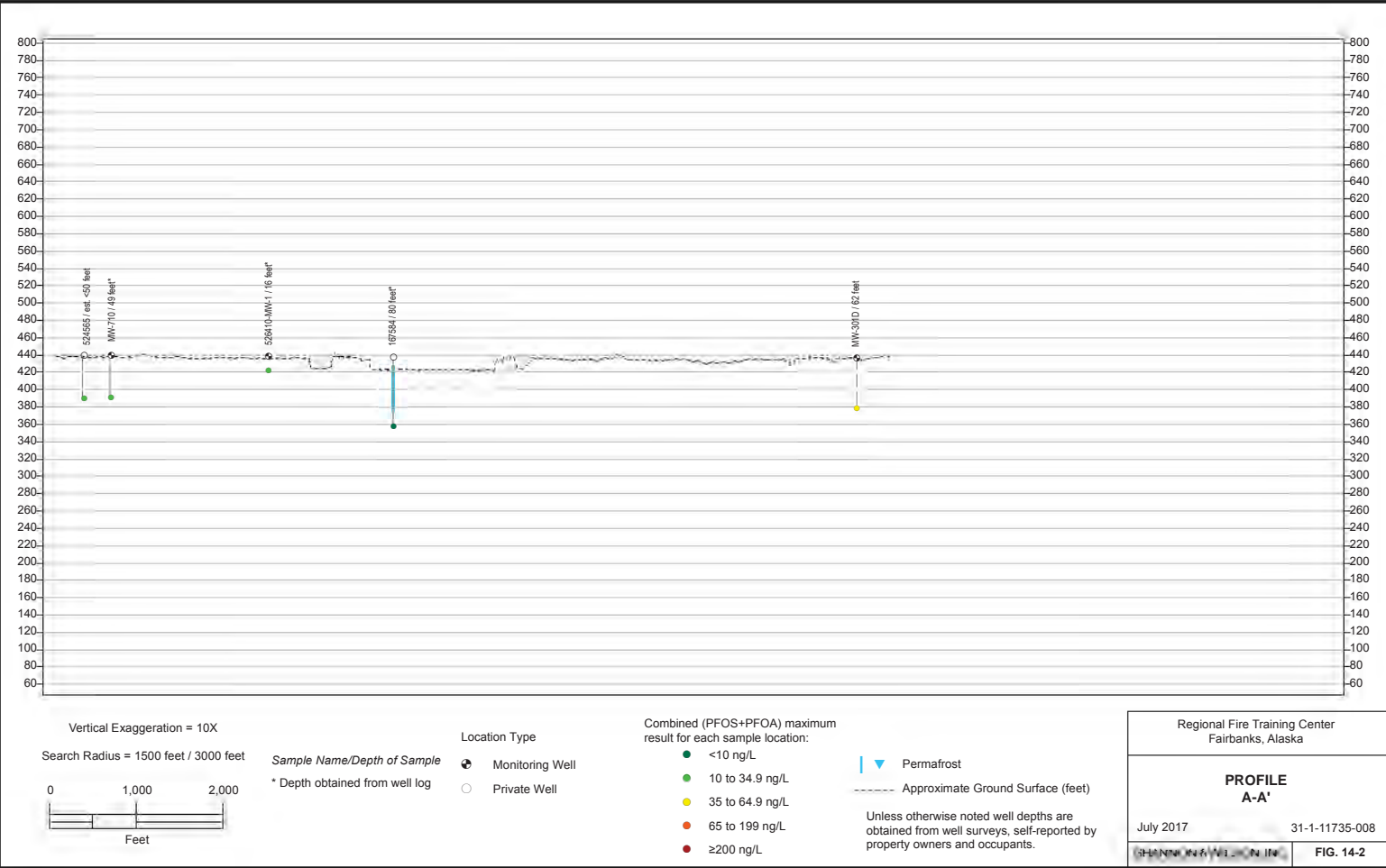
July 2017

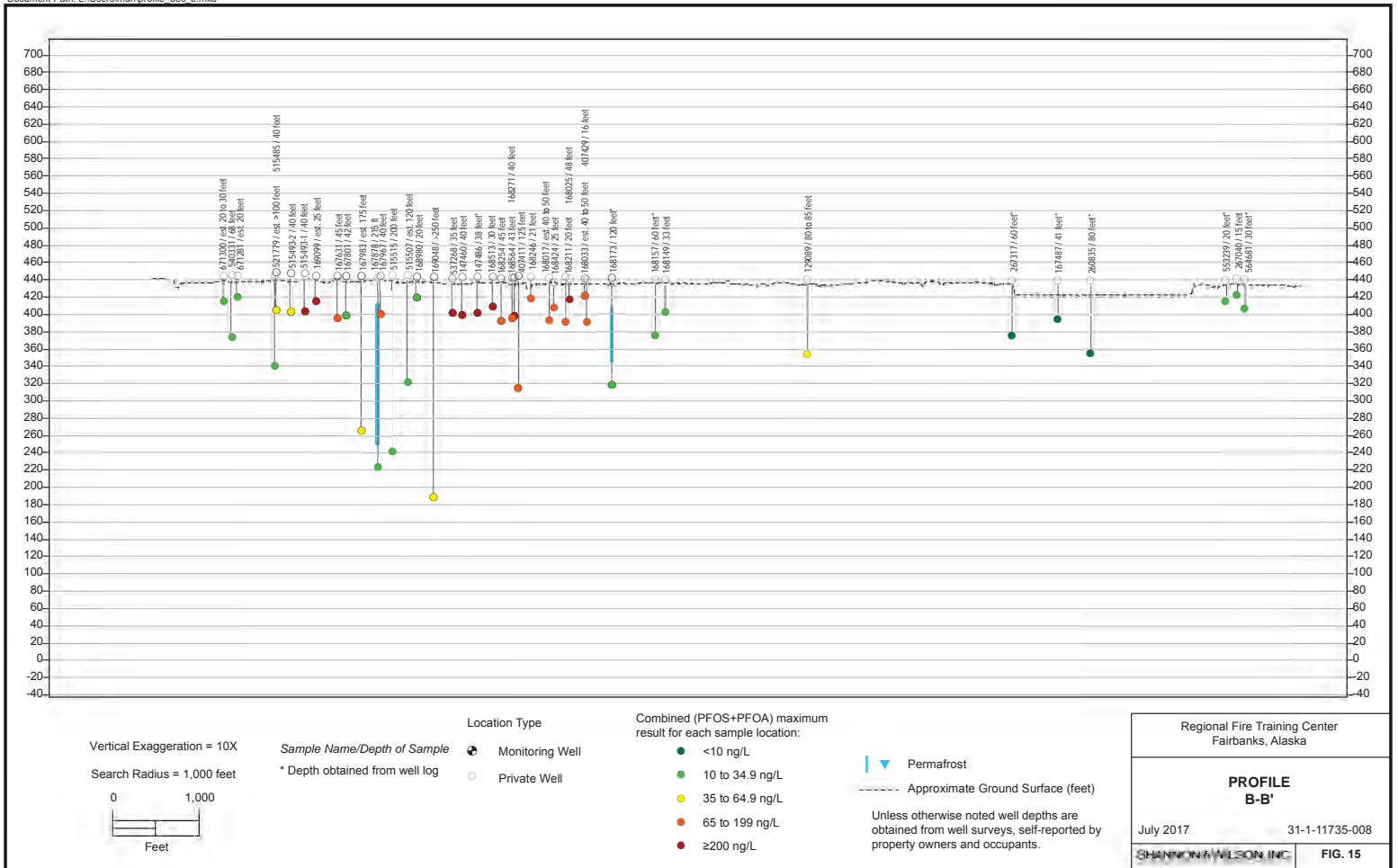
31-1-11735-008

SHANNON & WILSON, INC.

FIG. 13







APPENDIX A
PUBLIC CORRESPONDENCE



800 Cushman Street
Fairbanks, AK 99701

Telephone (907) 459-6770
Fax (907) 452-5913

November 3, 2016

Dear Property Owner or Occupant:

The City of Fairbanks would like to invite you to a community meeting on Thursday, November 17 to discuss the presence of perfluorinated compounds (PFCs) in groundwater near the Regional Fire Training Center (RFTC) at 1730 30th Avenue. You are receiving this invitation because we have collected or may collect a sample from the water-supply well at your home or business, but other individuals who live in the RFTC area are also welcome to attend.

Regional Fire Training Center Community Meeting

Thursday, November 17

5:30 pm to 7:00 pm

City Hall, 800 Cushman Street

Council Chambers, 2nd Floor

The City is continuing to work with local environmental consulting firm Shannon & Wilson Inc. to assess the extent of PFC-containing groundwater near the RFTC. On the reverse side of this letter is an updated Fact Sheet about PFCs, including a link to the Alaska Department of Environmental Conservation's project website. At this meeting we will discuss the health effects of PFOS and PFOA, summarize our work that has been to date, and answer any questions you may have.

CITY OF FAIRBANKS

Jackson C. Fox
City Engineer

City of Fairbanks

FACT SHEET – Well Testing for Perfluorinated Compounds

NOVEMBER 2016

Perfluorinated compounds (PFCs) are a group of manmade chemicals that have been used for a wide variety of residential, commercial, and industrial uses. PFCs are classified as emerging environmental contaminants because they do not have established regulatory standards, but evolving science has identified potential risk to human health and regulatory standards are under consideration. The City of Fairbanks has discovered PFC contamination at the Regional Fire Training Center (RFTC) at 1710 30th Avenue and is working in coordination with state regulators to identify affected wells and, when necessary, take responsive action.

KEY MESSAGES & QUICK FACTS

The City will ask to test private wells where it believes PFCs could be present based on the known pattern of groundwater flow. Test results will typically be available within four weeks.

The U.S. Environmental Protection Agency (EPA) issued a lifetime health advisory level for PFCs in May 2016. The health advisory level has been set with a sufficient margin of protection for a lifetime of exposure to PFOA and PFOS from drinking water, including for sensitive populations such as children. PFOA refers to perfluorooctanoic acid; PFOS refers to perfluorooctane sulfonate.

The City has adopted the EPA lifetime health advisory level of **70 nanograms per liter (ng/L)** for PFOS, PFOA, or the sum of the two as the level above which action should be taken to reduce exposure in drinking water.

The new health advisory level has been set based on the latest peer-reviewed science. However, the human health risks associated with PFC exposure have not been definitively established.

The City has confirmed that PFCs are present above the lifetime health advisory level in the groundwater at the RFTC and in water from some private wells. The occupants of these homes and businesses have been offered bottled water delivery at no cost, and some will be connected to the municipal water system this year.

PFCs are used in a large number of products ranging from fabric waterproofing compounds, non-stick cookware, stain-resistant carpeting, some food packaging, and firefighting agents.

From 1984 to 2004, firefighters from the City of Fairbanks and other agencies used Aqueous Film Forming Foam, a firefighting agent that contained PFCs, during training to extinguish petroleum fires at the RFTC.

PFCs are resistant to degradation by natural processes.

For more information, please visit:
www.dec.alaska.gov/spar/csp/sites/FairbanksFireTrainingCenter.htm

CONTACTS

For questions about well testing & study:

Shannon & Wilson Inc.

Marcy Nadel, Project Manager

Phone 907-458-3150

Email mdn@shanwil.com

For regulatory questions:

Alaska Dept of Environmental Conservation,
Contaminated Sites Program

Robert Burgess, Environmental Program
Specialist III

Phone 907-451-2153

Email robert.burgess@alaska.gov

For questions about PFC health effects:

Alaska Dept of Health & Social Services

Stacey Cooper, Health Assessor

Phone 907-269-8016

Email stacey.cooper@alaska.gov

Division of Public Health Website:

www.dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx

For questions about RFTC & all other inquiries:

City of Fairbanks, Engineering Division

Jackson Fox, City Engineer

Phone 907-459-6758

Email jcfox@ci.fairbanks.ak.us

800 Cushman Street
Fairbanks, AK 99701Telephone (907) 459-6770
Fax (907) 452-5913

November 18, 2016

Dear Property Owner:

The City of Fairbanks (City) was alerted to concentrations of perfluorinated compounds (PFCs) in the groundwater at the Regional Fire Training Center (RFTC) at 1710 30th Avenue in late 2015. From 1984 to around 2004, firefighters from the City and other agencies used Aqueous Film Forming Foam, a firefighting agent that contained PFCs, during training to extinguish petroleum fires at the RFTC. The PFCs discovered in the groundwater at the RFTC are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level for drinking water.

The City is working with a local environmental consulting firm, Shannon & Wilson Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near and down-gradient from the RFTC for PFCs. In February, Shannon & Wilson began contacting property owners and sampling private water-supply wells within approximately one-half mile of the RFTC. The City has expanded the well search iteratively since February in response to PFC-sample data from private wells in the area. We are continuing to expand the private well search area as additional data becomes available.

The City realizes that a portion of the search area is served by the Golden Heart Utilities and College Utilities water systems. We assume that you either do not have a private water-supply well, or that your well is used as a secondary water source only. If your property has an active well, please contact Shannon & Wilson. On the reverse side of this letter is a Fact Sheet about PFCs, including Shannon & Wilson contact information.

The City is not going to mandate property owners decommission their wells. With this effort the City seeks to identify those who may be at risk of drinking water containing PFCs above health advisory levels. If anyone is found to be at risk, the City will assist those property owners to provide access to clean drinking water.

If you have any other questions, please see the enclosed list of contacts to help direct you to the most appropriate person/agency for your inquiry.

CITY OF FAIRBANKS

Jackson C. Fox
City Engineer

City of Fairbanks

FACT SHEET – Well Testing for Perfluorinated Compounds

NOVEMBER 2016

Perfluorinated compounds (PFCs) are a group of manmade chemicals that have been used for a wide variety of residential, commercial, and industrial uses. PFCs are classified as emerging environmental contaminants because they do not have established regulatory standards, but evolving science has identified potential risk to human health and regulatory standards are under consideration. The City of Fairbanks has discovered PFC contamination at the Regional Fire Training Center (RFTC) at 1710 30th Avenue and is working in coordination with state regulators to identify affected wells and, when necessary, take responsive action.

KEY MESSAGES & QUICK FACTS

The City will ask to test private wells where it believes PFCs could be present based on the known pattern of groundwater flow. Test results will typically be available within four weeks.

The U.S. Environmental Protection Agency (EPA) issued a lifetime health advisory level for PFCs in May 2016. The health advisory level has been set with a sufficient margin of protection for a lifetime of exposure to PFOA and PFOS from drinking water, including for sensitive populations such as children. PFOA refers to perfluorooctanoic acid; PFOS refers to perfluorooctane sulfonate.

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PFCs are resistant to degradation by natural processes.

For more information, please visit:
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Phone 907-269-8016

Email stacey.cooper@alaska.gov

Division of Public Health Website:

www.dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx

For questions about RFTC & all other inquiries:

City of Fairbanks, Engineering Division

Jackson Fox, City Engineer

Phone 907-459-6758

Email jcfox@ci.fairbanks.ak.us

CITY OF FAIRBANKS

800 Cushman Street
Fairbanks, AK 99701



PUBLIC WORKS DEPARTMENT
Engineering Division

Telephone (907) 459-6770
Fax (907) 452-5913

November 21, 2016

Dear Property Owner or Occupant:

The City of Fairbanks continues to work with a local environmental consulting firm Shannon & Wilson Inc. and the Alaska Department of Environmental Conservation to identify and sample private water wells near and down-gradient from the Regional Fire Training Center (RFTC) at 1730 30th Avenue. The samples are analyzed for perfluorinated compounds (PFCs). You are receiving this letter because we have collected a sample from the water-supply well at your home or business.

The State of Alaska Department of Health and Social Services has prepared a fact sheet describing the health effects associated with exposure to perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), enclosed. The State's fact sheet was revised this month to include other PFCs and to reflect the latest scientific research. A previous publication addressed the health effects of PFOS only. Please note that PFCs are equivalent to perfluoroalkyl substances (PFAS).

If you have any questions regarding the health effects of PFCs please feel free to contact Stacey Cooper of the Alaska Section of Epidemiology at (907) 269-8016 or stacey.cooper@alaska.gov. If you have questions regarding other matters please contact us, Shannon & Wilson, or the Alaska Department of Environmental Conservation.

CITY OF FAIRBANKS

Jackson C. Fox
City Engineer



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

Department of Health and Social Services

DIVISION OF PUBLIC HEALTH
Section of Epidemiology

3601 C Street, Suite 540
Anchorage, Alaska 99503
Main: 507.269.8000
Fax: 907.562.7802

November 17, 2016

Perfluoroalkyl Substances — Regional Fire Training Center, Fairbanks, Alaska

Introduction

Recently, chemicals called perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) were found at the Regional Fire Training Center (RFTC) in Fairbanks, Alaska (1710 30th Avenue) — and in water wells nearby. Contact with these chemicals — such as drinking contaminated water — may cause health problems. Below you'll find information you need to know about PFOS and PFOA.

Summary

- PFOS and PFOA are chemicals that may harm your health.
- If your well has levels of PFOS and PFOA higher than the health advisory (0.07 micrograms per liter), you should use another water source for drinking water and cooking.
- You can still use your water to bathe, clean, wash dishes, and do laundry.
- The City of Fairbanks is providing drinking water to people whose well water is above EPA's advisory level for PFOS and PFOA.

About PFOS and PFOA

What are PFOS and PFOA?

PFOS and PFOA are perfluoroalkyl substances (PFAS) — human-made chemicals that have been used for both residential and industrial purposes. PFAS have been found in some products that resist fire, stains, grease, and water such as:

- Furniture
- Carpeting
- Clothing
- Firefighting foams
- Food Packaging

At the RFTC, the source(s) of PFAS is certain firefighting foams that contained PFAS.

How could I come into contact with PFAS?

Because PFAS were widely used worldwide, stay in the environment for a long time, and travel long distances in water and air, there are small amounts in many water and some food sources. Most people have come into contact with low levels of PFAS. PFAS are also found in the blood or tissue of wildlife, like fish and marine mammals such as seals and sea lions.

Usually, people come into contact with PFAS by eating or drinking them in food and water. Additionally:

- Women who are exposed to PFAS pass it to their unborn babies during pregnancy — and to their infants through breastfeeding.
- Children may come into contact with small amounts of PFAS in the home by touching products (such as carpet) with PFAS and then putting their hands in their mouths.

How can PFAS affect my health?

Some, but not all, scientific literature suggests that certain PFAS may affect a variety of systems in the body. Additional research is needed to better understand possible human health effects from exposure to PFAS in water and food.

Scientists are not yet certain about the possible health effects resulting from human exposure to PFAS at levels typically found in our food and water. Some, but not all studies in humans have suggested that certain PFAS may affect the developing fetus and child. Potential health effects from exposure to PFAS may include:

- Affect the development of unborn babies and breastfeeding infants — including possible changes in growth, learning, and behavior
- Decrease fertility and interfere with the body's natural hormones
- Increase cholesterol
- Affect the immune system
- Increase the risk of cancer

More research is needed to confirm or rule out possible links between health effects of potential concern and exposure to PFAS. At this time, we cannot tell if drinking well water near the RFTC in Fairbanks could be causing any current health problems — or if it will cause problems in the future.

How can I tell if I have come into contact with PFAS?

PFAS can be measured in the blood, however, there are some limitations on blood tests to consider. Individuals who feel they may have been exposed to high levels of PFOA or PFOS and would like to have their blood levels measured should keep in mind that this is not a routine test that health care providers offer. The test results will not provide clear answers for existing or possible health effects. Individuals who feel the need to be tested should consult with their

health care provider, local and state health department or other health professionals on how to move forward. The body's natural elimination processes are the only way to remove PFAS from the body.

What is the health advisory for PFOS and PFOA?

The U.S. Environmental Protection Agency (EPA) has set a lifetime health advisory (LTHA) level for PFOS and PFOA — individually or combined— of no more than 0.07 micrograms per liter of water (µg/L or ppb-parts per billion). This amount is the same as 70 nanograms of PFOS or PFOA (or the 2 combined) per liter of water (ng/L or ppt-parts per trillion). The LTHA is designed to protect people from contact with PFOS and PFOA in drinking water — particularly unborn babies and infants (the populations most likely to be affected by exposure to PFOS and PFOA).

Safety Information for Fairbanks Residents

Can I drink my well water? What about my pets?

If levels of PFOS or PFOA (or the 2 combined) are at or above the health advisory level (0.07 micrograms per liter), do **not** drink your tap water or use it to prepare baby formula. Also avoid giving it to pets and other animals.

Is it safe to cook with my well water?

If your well water has levels of PFOS or PFOA (or the 2 combined) at or above the health advisory, do **not** use your well water to cook — even if you heat or boil it first. Boiling water doesn't remove PFOS and PFOA.

Is it safe to shower, take baths, and brush my teeth with my well water?

It is very unlikely that showering or taking baths with well water could cause any health problems. This is because:

- Your skin does not absorb (take in) enough PFOS and PFOA to cause problems. PFOS and PFOA also do not irritate the skin.
- PFOS and PFOA do not move easily from water to air — that means it is unlikely that you will breathe it in when using well water.

It is safe to shower and bathe in PFAS- contaminated water. If your water contains PFAS, particularly if levels exceed the LTHA, you can reduce exposure by using an alternative or treated water source for brushing teeth, and any activity that might result in ingestion of water.

Can I clean, wash dishes, wash clothes, and rinse food with my well water?

It is safe to use well water to clean your house, wash dishes, and do laundry. However, we recommend that you rinse food with clean water.

Can I breastfeed my child if I have been drinking my well water?

Breastfeeding is linked with numerous health benefits for both infants and mothers. At this time, it is recommended that nursing mothers continue to breastfeed. The science on the health effects of PFAS for mothers and babies is evolving. However, given the scientific understanding at this time, the benefits of breastfeeding outweigh any known risk. To better weigh the risks and benefits of breastfeeding, please talk to your doctor.

Is it safe to water my vegetable garden with my well water?

We do not have a clear answer to this question at this time. Some studies have shown that vegetables grown in soil with high levels of PFAS may absorb the chemicals. But this could depend on a lot of different factors (e.g., level of PFAS in water, the type of PFAS contamination, the amount of garden watering, and the type of produce grown).

One recent study showed that garden plants watered with water contaminated with PFAS took in only very small amounts of the chemicals. The study also noted that the health benefits of eating fresh vegetables outweigh any health risks from small amounts of PFAS.

Soil particles can stick to plants, vegetables, and fruits. Low-lying plants, leafy vegetables (e.g., spinach and lettuce) and root crops (e.g., potatoes and carrots) are more likely to have soil particles on them and possibly contribute to human exposure through incidental ingestion. Some studies show that PFAS can accumulate at low levels in plant roots. Uptake of contaminants by the roots of a plant may move into other portions of the plant but usually at even lower concentrations. Your exposure to PFAS through garden vegetables is not likely to be significant compared to other primary exposure routes such as drinking contaminated water.

In the end it is up to you. Some people living near the RFTC may feel more comfortable using a different water source with confirmed lower PFAS levels for their vegetable gardens. However, if you choose to use your well for your garden, we recommend you wash your vegetables with clean water and peel root vegetables.

Is it safe to swim in Peger Lake?

Yes. The levels of PFOS and PFOA in water tested from Peger Lake are below the health advisory. This means you can swim in the lake — and it is okay if you accidentally swallow some water during your swim.

Next Steps**How often will my well water be tested for PFAS?**

The City of Fairbanks is currently checking wells near the RFTC. How often the wells are checked will depend on how high the levels of PFAS are — and how the water is used.

The City of Fairbanks will work with the Alaska Department of Environmental Conservation (ADEC) to make a long-term plan for tracking the wells until there is another permanent source of safe drinking water.

What is the Alaska Section of Epidemiology doing to address concerns about PFAS in drinking water?

The Section of Epidemiology is taking steps to protect Fairbanks residents, including:

- Working with ADEC and the Agency for Toxic Substances and Disease Registry (ATSDR) to understand how PFAS from well water may affect people living near the RFTC
- Finding more information about PFAS and updating our recommendations as data become available.

Where can I get more information?

- To learn more about health effects of PFAS, contact the Alaska Section of Epidemiology at **907-269-8000**.
- To learn more about well water testing, contact the Alaska Department of Environmental Conservation at **907-451-2153**.
- If you have health concerns about PFAS, please talk with your health care provider.

You can also find additional information in the following resources:

- Alaska Department of Environmental Conservation RFTC web page:
<https://dec.alaska.gov/spar/csp/sites/FairbanksFireTrainingCenter.htm>
- ATSDR's PFAS web page:
<https://www.atsdr.cdc.gov/pfc/index.html>
- PFOS and PFOA Drinking Water Health Advisories (EPA)
https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf
- Alaska Environmental Public Health Program
<http://dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx>

800 Cushman Street
Fairbanks, AK 99701Telephone (907) 459-6770
Fax (907) 452-5913

November 21, 2016

Dear Property Owner:

The City of Fairbanks (City) was alerted to concentrations of perfluorinated compounds (PFCs) in the groundwater at the Regional Fire Training Center (RFTC) at 1710 30th Avenue in late 2015. From 1984 to around 2004, firefighters from the City and other agencies used Aqueous Film Forming Foam, a firefighting agent that contained PFCs, during training to extinguish petroleum fires during training at the RFTC. The PFCs discovered in the groundwater at the RFTC are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level for drinking water.

The City is working with a local environmental consulting firm, Shannon & Wilson Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near and down-gradient from the RFTC for PFCs. In February, Shannon & Wilson began contacting property owners and sampling private water-supply wells within approximately one-half mile of the RFTC. The City has expanded the well search iteratively since February in response to PFC-sample data from private wells in the area. We are continuing to expand the private well search area as additional data becomes available.

Enclosed is a Fact Sheet about PFCs, agency contact information to help address questions, and a Private Well Inventory Survey Form. The City asks that you review this information and return the survey as soon as possible using the preaddressed envelope. Your participation in the survey helps ensure the study is not only thorough, but also identifies those at risk of drinking PFC-contaminated water.

The City realizes that a portion of the search area is served by the Golden Heart Utilities and College Utilities water systems. With this effort the City seeks to identify those who may be at risk of drinking water containing PFCs above health advisory levels. The City is not going to mandate property owners decommission their wells. If anyone is found to be at risk, the City will assist those property owners to provide access to clean drinking water.

If you have any questions, please see the list of contacts on the Fact Sheet to help direct you to the most appropriate person/agency for your inquiry. We look forward to receiving your completed survey.

CITY OF FAIRBANKS

Jackson C. Fox
City Engineer

City of Fairbanks

FACT SHEET – Well Testing for Perfluorinated Compounds

NOVEMBER 2016

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KEY MESSAGES & QUICK FACTS

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**Private Well Inventory Survey
Form**

Date: _____

Parcel _____

Name (Owner): _____

Name (Occupant): _____

Physical Address: _____

Mailing Address: _____

Email Address (optional): _____

Contact Phone Number: (owner) _____ (occupant) _____

Number of persons residing at this location: Adults (18 and over) _____

Teenagers (13 to 17) _____

Children (12 and under) _____

Years at this residence: _____ Full-Time ☐ Seasonal ☐

1) From where do you obtain your drinking water?

- a) Municipal Water Supply ☐ b) Well Water ☐
c) Water Delivery ☐

2) If you have a water well, please answer the following questions:

a) Where is the well located on the property? _____

b) Is the well in use? Yes ☐ No ☐

c) If yes, please check all that apply regarding the usage of your well water:

Drinking ☐ Cooking ☐ Gardening ☐ Pets ☐ Other _____

d) If no, is the well usable, unusable, or properly abandoned?

Usable ☐ Unusable ☐ Abandoned ☐ Method _____

e) When was the well installed? _____

f) What is the well depth? _____

g) What is the well diameter? _____

h) What is the well type? ☐ Dug Well ☐ Driven
☐ Drilled ☐ Unknown

i) Do you have any treatment on your well (e.g. water softener)? Please describe. _____

3) Sample Permission

Does the City of Fairbanks have your permission to sample your private water supply well?

☐ Yes ☐ No

Signature

Date

800 Cushman Street
Fairbanks, AK 99701Telephone (907) 459-6770
Fax (907) 452-5913

February 2, 2017

Dear Property Owner:

The City of Fairbanks (City) was alerted to concentrations of perfluorinated compounds (PFCs) in the groundwater at the Regional Fire Training Center (RFTC) at 1710 30th Avenue in late 2015. From 1984 to around 2004, firefighters from the City and other agencies used Aqueous Film Forming Foam, a firefighting agent that contained PFCs, during training to extinguish petroleum fires at the RFTC. The PFCs discovered in the groundwater at the RFTC are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level for drinking water.

The City is working with a local environmental consulting firm, Shannon & Wilson Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near and down-gradient from the RFTC for PFCs. In February 2016, Shannon & Wilson began contacting property owners and sampling private water-supply wells within approximately one-half mile of the RFTC. The City has expanded the well search iteratively since February in response to PFC-sample data from private wells in the area. We are continuing to expand the private well search area as additional data becomes available.

Enclosed is a Fact Sheet about PFCs, agency contact information to help address questions, and a Private Well Inventory Survey Form. The City asks that you review this information and return the survey as soon as possible using the preaddressed envelope. Your participation in the survey helps ensure the study is not only thorough, but also identifies those at risk of drinking PFC-contaminated water.

The City realizes that a portion of the search area is served by the Golden Heart Utilities and College Utilities water systems. With this effort the City seeks to identify those who may be at risk of drinking water containing PFCs above health advisory levels. The City is not going to mandate property owners decommission their wells. If anyone is found to be at risk, the City will assist those property owners to provide access to clean drinking water.

If you have any questions, please see the list of contacts on the Fact Sheet to help direct you to the most appropriate person/agency for your inquiry. We look forward to receiving your completed survey.

CITY OF FAIRBANKS

Jackson C. Fox
City Engineer

City of Fairbanks

FACT SHEET – Well Testing for Perfluorinated Compounds

FEBRUARY 2017

Perfluorinated compounds (PFCs) are a group of manmade chemicals that have been used for a wide variety of residential, commercial, and industrial uses. PFCs are classified as emerging environmental contaminants because they do not have established regulatory standards, but evolving science has identified potential risk to human health and regulatory standards are under consideration. The City of Fairbanks has discovered PFC contamination at the Regional Fire Training Center (RFTC) at 1710 30th Avenue and is working in coordination with state regulators to identify affected wells and, when necessary, take responsive action.

KEY MESSAGES & QUICK FACTS

The City will ask to test private wells where it believes PFCs could be present based on the known pattern of groundwater flow. Test results will typically be available within four weeks.

The U.S. Environmental Protection Agency (EPA) issued a lifetime health advisory level for PFCs in May 2016. The health advisory level has been set with a sufficient margin of protection for a lifetime of exposure to PFOA and PFOS from drinking water, including for sensitive populations such as children. PFOA refers to perfluorooctanoic acid; PFOS refers to perfluorooctane sulfonate.

The City has adopted the EPA lifetime health advisory level of **70 nanograms per liter (ng/L)** for PFOS, PFOA, or the sum of the two as the level above which action should be taken to reduce exposure in drinking water.

The health advisory level has been set based on the latest peer-reviewed science. However, the human health risks associated with PFC exposure have not been definitively established.

The City has confirmed that PFCs are present above the lifetime health advisory level in the groundwater at the RFTC and in water from some private wells. The occupants of these homes and businesses have been offered bottled water delivery at no cost, and some were connected to the municipal water system in 2016.

PFCs are used in a large number of products ranging from fabric waterproofing compounds, non-stick cookware, stain-resistant carpeting, some food packaging, and firefighting agents.

From 1984 to 2004, firefighters from the City of Fairbanks and other agencies used Aqueous Film Forming Foam, a firefighting agent that contained PFCs, during training to extinguish petroleum fires at the RFTC.

PFCs are resistant to degradation by natural processes.

For more information, please visit:
www.dec.alaska.gov/spar/csp/sites/FairbanksFireTrainingCenter.htm

CONTACTS

For questions about well testing & study:

Shannon & Wilson Inc.

Marcy Nadel, Project Manager

Phone 907-458-3150

Email mdn@shanwil.com

For regulatory questions:

Alaska Dept of Environmental Conservation,
Contaminated Sites Program

Robert Burgess, Environmental Program
Specialist III

Phone 907-451-2153

Email robert.burgess@alaska.gov

For questions about PFC health effects:

Alaska Dept of Health & Social Services

Stacey Cooper, Health Assessor

Phone 907-269-8016

Email stacey.cooper@alaska.gov

Division of Public Health Website:

www.dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx

For questions about RFTC & all other inquiries:

City of Fairbanks, Engineering Division

Jackson Fox, City Engineer

Phone 907-459-6758

Email jcfox@ci.fairbanks.ak.us

800 Cushman Street
Fairbanks, AK 99701Telephone (907) 459-6770
Fax (907) 452-5913

March 21, 2017

Dear Property Owner:

The City of Fairbanks (City) was alerted to concentrations of perfluorinated compounds (PFCs) in the groundwater at the Regional Fire Training Center (RFTC) at 1710 30th Avenue in late 2015. From 1984 to around 2004, firefighters from the City and other agencies used Aqueous Film Forming Foam, a firefighting agent that contained PFCs, during training to extinguish petroleum fires at the RFTC. The PFCs discovered in the groundwater at the RFTC are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level for drinking water.

The City is working with a local environmental consulting firm, Shannon & Wilson Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near and down-gradient from the RFTC for PFCs. The City has expanded the well search iteratively since February 2016 in response to PFC-sample data from private wells in the area. Test results indicate that PFCs are present at concentrations above the health advisory level in some wells northwest of the RFTC. The enclosed map, PFOA and PFOS Sample Results, shows the extent of concentrations above this level.

The City realizes that a portion of the search area is served by the Golden Heart Utilities and College Utilities water systems. We assume that you either do not have a private water-supply well, or that your well is used as a secondary water source only. If your property has an active well, please contact Shannon & Wilson. On the reverse side of this letter is a Fact Sheet about PFCs, including Shannon & Wilson contact information.

The City is not going to mandate property owners decommission their wells. With this effort the City seeks to identify those who may be at risk of drinking water containing PFCs above health advisory levels. If anyone is found to be at risk, the City will assist those property owners to provide access to clean drinking water.

If you have any other questions, please see the enclosed list of contacts to help direct you to the most appropriate person/agency for your inquiry.

CITY OF FAIRBANKS

Jackson C. Fox
City Engineer

City of Fairbanks

FACT SHEET – Well Testing for Perfluorinated Compounds

MARCH 2017

Perfluorinated compounds (PFCs) are a group of manmade chemicals that have been used for a wide variety of residential, commercial, and industrial uses. PFCs are classified as emerging environmental contaminants because they do not have established regulatory standards, but evolving science has identified potential risk to human health and regulatory standards are under consideration. The City of Fairbanks has discovered PFC contamination at the Regional Fire Training Center (RFTC) at 1710 30th Avenue and is working in coordination with state regulators to identify affected wells and, when necessary, take responsive action.

KEY MESSAGES & QUICK FACTS

The City will ask to test private wells where it believes PFCs could be present based on the known pattern of groundwater flow. Test results will typically be available within four weeks.

The U.S. Environmental Protection Agency (EPA) issued a lifetime health advisory level for PFCs in May 2016. The health advisory level has been set with a sufficient margin of protection for a lifetime of exposure to PFOA and PFOS from drinking water, including for sensitive populations such as children. PFOA refers to perfluorooctanoic acid; PFOS refers to perfluorooctane sulfonate.

The City has adopted the EPA lifetime health advisory level of **70 nanograms per liter (ng/L)** for PFOS, PFOA, or the sum of the two as the level above which action should be taken to reduce exposure in drinking water.

The health advisory level has been set based on the latest peer-reviewed science. However, the human health risks associated with PFC exposure have not been definitively established.

The City has confirmed that PFCs are present above the lifetime health advisory level in the groundwater at the RFTC and in water from some private wells. The occupants of these homes and businesses have been offered bottled water delivery at no cost, and some were connected to the municipal water system in 2016.

PFCs are used in a large number of products ranging from fabric waterproofing compounds, non-stick cookware, stain-resistant carpeting, some food packaging, and firefighting agents.

From 1984 to 2004, firefighters from the City of Fairbanks and other agencies used Aqueous Film Forming Foam, a firefighting agent that contained PFCs, during training to extinguish petroleum fires at the RFTC.

PFCs are resistant to degradation by natural processes.

For more information, please visit:
www.dec.alaska.gov/spar/csp/sites/FairbanksFireTrainingCenter.htm

CONTACTS

For questions about well testing & study:

Shannon & Wilson Inc.

Marcy Nadel, Project Manager

Phone 907-458-3150

Email mdn@shanwil.com

For regulatory questions:

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Contaminated Sites Program

Robert Burgess, Environmental Program
Specialist III

Phone 907-451-2153

Email robert.burgess@alaska.gov

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Stacey Cooper, Health Assessor

Phone 907-269-8016

Email stacey.cooper@alaska.gov

Division of Public Health Website:

www.dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx

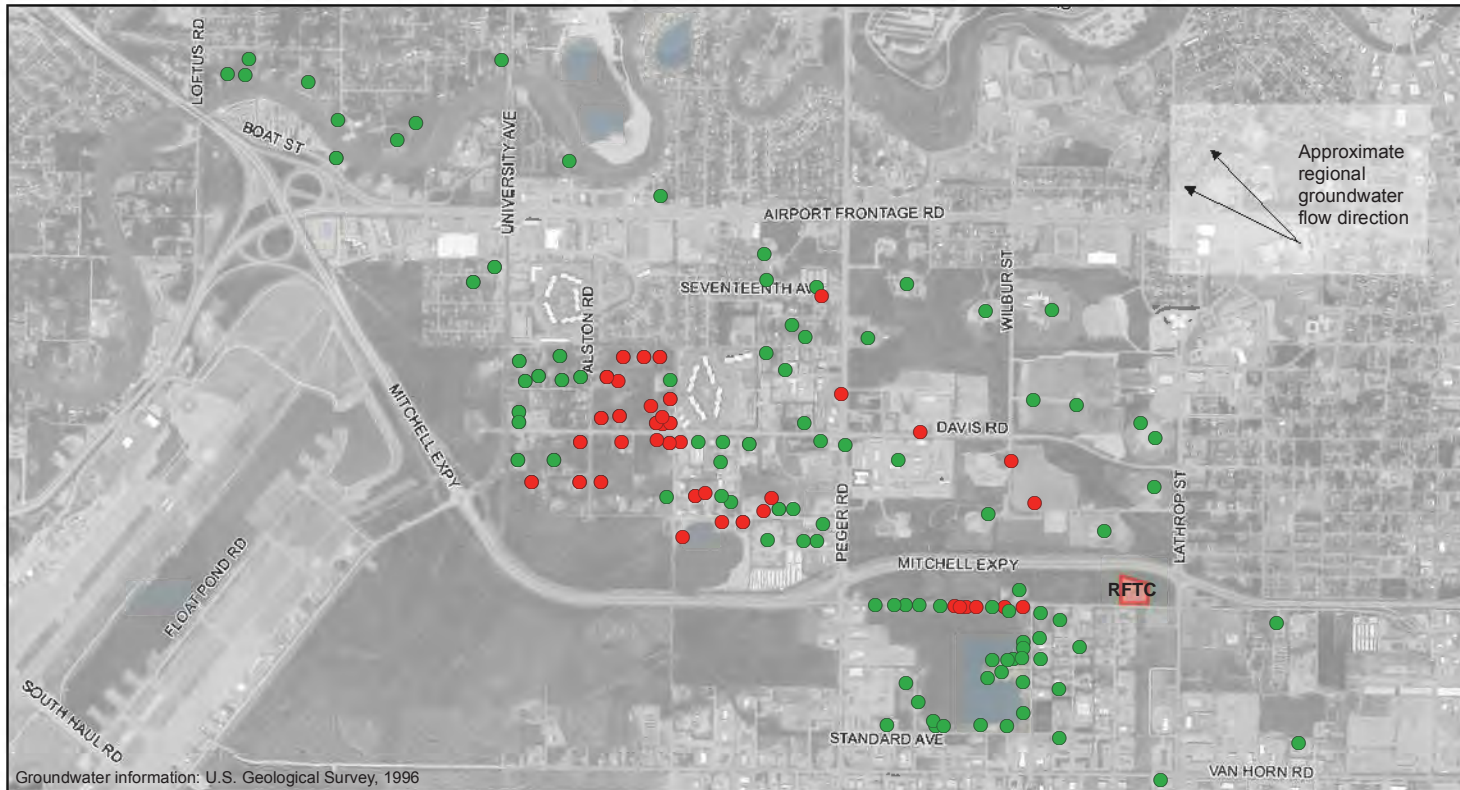
For questions about RFTC & all other inquiries:

City of Fairbanks, Engineering Division

Jackson Fox, City Engineer

Phone 907-459-6758

Email jcfox@ci.fairbanks.ak.us



LEGEND

- Under Lifetime Health Advisory Level (70 ng/L)
- Over 70 ng/L
- Result not yet recieved
- RFTC Site



Regional Fire Training Center
Fairbanks, Alaska

PFOA AND PFOS SAMPLE RESULTS

March 2017

31-1-11735-009

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

Figure 1

800 Cushman Street
Fairbanks, AK 99701Telephone (907) 459-6770
Fax (907) 452-5913

March 29, 2017

Dear Property Owner:

The City of Fairbanks (City) was alerted to concentrations of perfluorinated compounds (PFCs) in the groundwater at the Regional Fire Training Center (RFTC) at 1710 30th Avenue in late 2015. From 1984 to around 2004, firefighters from the City and other agencies used Aqueous Film Forming Foam, a firefighting agent that contained PFCs, during training to extinguish petroleum fires at the RFTC. The PFCs discovered in the groundwater at the RFTC are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level for drinking water.

The City is working with a local environmental consulting firm, Shannon & Wilson Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near and down-gradient from the RFTC for PFCs. In February 2016, Shannon & Wilson began contacting property owners and sampling private water-supply wells within approximately one-half mile of the RFTC. The City has expanded the well search iteratively since February in response to PFC-sample data from private wells in the area. We are continuing to expand the private well search area as additional data becomes available.

Enclosed is a Fact Sheet about PFCs, agency contact information to help address questions, and a Private Well Inventory Survey Form. The City asks that you review this information and return the survey as soon as possible using the preaddressed envelope. Your participation in the survey helps ensure the study is not only thorough, but also identifies those at risk of drinking PFC-contaminated water.

The City realizes that a portion of the search area is served by the Golden Heart Utilities and College Utilities water systems. With this effort the City seeks to identify those who may be at risk of drinking water containing PFCs above health advisory levels. The City is not going to mandate property owners decommission their wells. If anyone is found to be at risk, the City will assist those property owners to provide access to clean drinking water.

If you have any questions, please see the list of contacts on the Fact Sheet to help direct you to the most appropriate person/agency for your inquiry. We look forward to receiving your completed survey.

CITY OF FAIRBANKS

Jackson C. Fox
City Engineer

City of Fairbanks

FACT SHEET – Well Testing for Perfluorinated Compounds

MARCH 2017

Perfluorinated compounds (PFCs) are a group of manmade chemicals that have been used for a wide variety of residential, commercial, and industrial uses. PFCs are classified as emerging environmental contaminants because they do not have established regulatory standards, but evolving science has identified potential risk to human health and regulatory standards are under consideration. The City of Fairbanks has discovered PFC contamination at the Regional Fire Training Center (RFTC) at 1710 30th Avenue and is working in coordination with state regulators to identify affected wells and, when necessary, take responsive action.

KEY MESSAGES & QUICK FACTS

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Email mdn@shanwil.com

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800 Cushman Street
Fairbanks, AK 99701Telephone (907) 459-6770
Fax (907) 452-5913

April 14, 2017

Dear Property Owner:

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CITY OF FAIRBANKS

Jackson C. Fox
City Engineer

City of Fairbanks

FACT SHEET – Well Testing for Perfluorinated Compounds

APRIL 2017

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Phone 907-459-6758

Email jcfox@ci.fairbanks.ak.us

APPENDIX B

COMPLETED PRIVATE WELL INVENTORY SURVEY FORMS

This appendix contains personal information. Content has been removed for confidentiality.

APPENDIX C

COPY OF PRIVATE AND MONITORING WELL SAMPLING LOGS

This appendix contains personal information. Content has been removed for confidentiality.

APPENDIX D
PROJECT PHOTOGRAPHS



Photo 1: We collected a post-treatment sample (407429-D) from the granular activated carbon (GAC) treatment system outlet at 3350 Holden Road. (December 14, 2016)

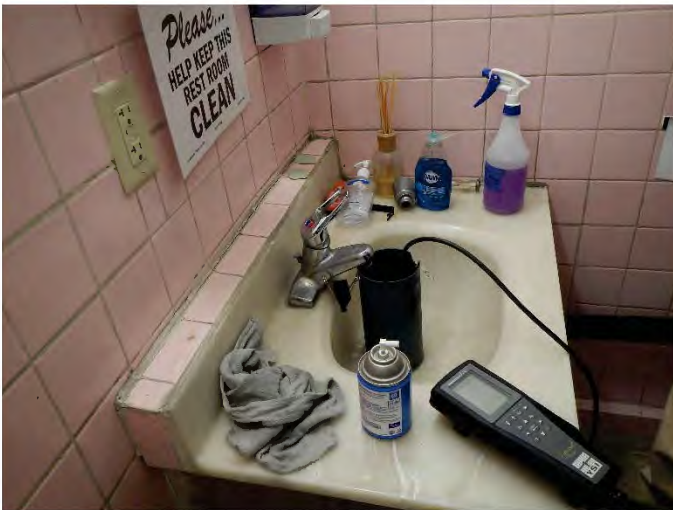


Photo 2: Example private well purge using YSI water quality meter, bathroom sink at 2375 University Avenue. (April 3, 2017)



Photo 3: Example private well sample location, pre-treatment spigot in front of the pressure tank at 2375 University Avenue. (April 3, 2017)



Photo 4: We sampled the unused well at 2605 Picket Place using a peristaltic pump. (February 7, 2017)



Photo 5: Sampling MW-507, a ADOT&PF well on Davis Road; facing east. (April 18, 2017)

APPENDIX E

**ANALYTICAL LABORATORY REPORTS
AND ADEC DATA REVIEW CHECKLISTS**

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-23633-1

TestAmerica Sample Delivery Group: 31-1-11735-007

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

12/8/2016 8:45:15 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



**Ask
The
Expert**

Visit us at:

www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Qualifiers

LCMS

Qualifier	Qualifier Description
-----------	-----------------------

J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
---	--

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
--------------	---

α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Job ID: 320-23633-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-23633-1

Receipt

The samples were received on 11/17/2016 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.0° C.

LCMS

Method(s) PFAS: The samples were analyzed by the direct injection method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.0 "Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissue".

Method(s) PFAS: The laboratory control sample (LCS) for preparation batch 320-139615, 320-139615 and 320-139615 and analytical batch 320-139773 recovered outside control limits for the following analytes: Perfluoroheptanoic acid (PFHpA) and Perfluorononanoic acid (PFNA). These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-140118.

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

Detection Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Client Sample ID: 168491

Lab Sample ID: 320-23633-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	63		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.0		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	29		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	130		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168386

Lab Sample ID: 320-23633-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.9		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	24		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.2	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	5.2		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	34		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168378

Lab Sample ID: 320-23633-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.9		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	24		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.3	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	5.3		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168157

Lab Sample ID: 320-23633-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.6		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	22		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	5.1		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	14		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Client Sample ID: 168491

Date Collected: 11/15/16 10:30

Date Received: 11/17/16 09:40

Lab Sample ID: 320-23633-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14		2.0	0.92	ng/L		12/01/16 08:54	12/03/16 05:00	1
Perfluorohexanesulfonic acid (PFHxS)	63		2.0	0.87	ng/L		12/01/16 08:54	12/03/16 05:00	1
Perfluoroheptanoic acid (PFHpA)	6.0		2.0	0.80	ng/L		12/01/16 08:54	12/03/16 05:00	1
Perfluorooctanoic acid (PFOA)	29		2.0	0.75	ng/L		12/01/16 08:54	12/03/16 05:00	1
Perfluorooctanesulfonic acid (PFOS)	130		2.0	1.3	ng/L		12/01/16 08:54	12/03/16 05:00	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/01/16 08:54	12/03/16 05:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		25 - 150				12/01/16 08:54	12/03/16 05:00	1
13C4-PFHpa	111		25 - 150				12/01/16 08:54	12/03/16 05:00	1
13C4 PFOA	96		25 - 150				12/01/16 08:54	12/03/16 05:00	1
13C4 PFOS	98		25 - 150				12/01/16 08:54	12/03/16 05:00	1
13C5 PFNA	100		25 - 150				12/01/16 08:54	12/03/16 05:00	1

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Client Sample ID: 168386

Date Collected: 11/15/16 15:10

Date Received: 11/17/16 09:40

Lab Sample ID: 320-23633-2

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.9		2.0	0.92	ng/L		12/01/16 08:54	12/03/16 05:18	1
Perfluorohexanesulfonic acid (PFHxS)	24		2.0	0.87	ng/L		12/01/16 08:54	12/03/16 05:18	1
Perfluoroheptanoic acid (PFHpA)	1.2	J	2.0	0.80	ng/L		12/01/16 08:54	12/03/16 05:18	1
Perfluorooctanoic acid (PFOA)	5.2		2.0	0.75	ng/L		12/01/16 08:54	12/03/16 05:18	1
Perfluorooctanesulfonic acid (PFOS)	34		2.0	1.3	ng/L		12/01/16 08:54	12/03/16 05:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/01/16 08:54	12/03/16 05:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 150				12/01/16 08:54	12/03/16 05:18	1
13C4-PFHpa	116		25 - 150				12/01/16 08:54	12/03/16 05:18	1
13C4 PFOA	104		25 - 150				12/01/16 08:54	12/03/16 05:18	1
13C4 PFOS	106		25 - 150				12/01/16 08:54	12/03/16 05:18	1
13C5 PFNA	104		25 - 150				12/01/16 08:54	12/03/16 05:18	1

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Client Sample ID: 168378

Date Collected: 11/15/16 15:38

Date Received: 11/17/16 09:40

Lab Sample ID: 320-23633-3

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.9		2.0	0.92	ng/L		12/01/16 08:54	12/03/16 05:37	1
Perfluorohexanesulfonic acid (PFHxS)	24		2.0	0.87	ng/L		12/01/16 08:54	12/03/16 05:37	1
Perfluoroheptanoic acid (PFHpA)	1.3	J	2.0	0.80	ng/L		12/01/16 08:54	12/03/16 05:37	1
Perfluorooctanoic acid (PFOA)	5.3		2.0	0.75	ng/L		12/01/16 08:54	12/03/16 05:37	1
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L		12/01/16 08:54	12/03/16 05:37	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/01/16 08:54	12/03/16 05:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	105		25 - 150				12/01/16 08:54	12/03/16 05:37	1
13C4-PFHxA	107		25 - 150				12/01/16 08:54	12/03/16 05:37	1
13C4 PFOA	96		25 - 150				12/01/16 08:54	12/03/16 05:37	1
13C4 PFOS	100		25 - 150				12/01/16 08:54	12/03/16 05:37	1
13C5 PFNA	96		25 - 150				12/01/16 08:54	12/03/16 05:37	1

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Client Sample ID: 168157

Date Collected: 11/15/16 12:33

Date Received: 11/17/16 09:40

Lab Sample ID: 320-23633-4

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.6		2.0	0.92	ng/L		12/01/16 08:54	12/03/16 05:55	1
Perfluorohexanesulfonic acid (PFHxS)	22		2.0	0.87	ng/L		12/01/16 08:54	12/03/16 05:55	1
Perfluoroheptanoic acid (PFHpA)	2.0		2.0	0.80	ng/L		12/01/16 08:54	12/03/16 05:55	1
Perfluorooctanoic acid (PFOA)	5.1		2.0	0.75	ng/L		12/01/16 08:54	12/03/16 05:55	1
Perfluorooctanesulfonic acid (PFOS)	14		2.0	1.3	ng/L		12/01/16 08:54	12/03/16 05:55	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/01/16 08:54	12/03/16 05:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	98		25 - 150				12/01/16 08:54	12/03/16 05:55	1
13C4-PFHpa	108		25 - 150				12/01/16 08:54	12/03/16 05:55	1
13C4 PFOA	93		25 - 150				12/01/16 08:54	12/03/16 05:55	1
13C4 PFOS	92		25 - 150				12/01/16 08:54	12/03/16 05:55	1
13C5 PFNA	94		25 - 150				12/01/16 08:54	12/03/16 05:55	1

Isotope Dilution Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		¹⁸ O ₂ PFHx (25-150)	¹³ C ₄ -PFHp (25-150)	¹³ C ₄ PFOA (25-150)	¹³ C ₄ PFOA (25-150)	¹³ C ₅ PFNA (25-150)
320-23633-1	168491	104	111	96	98	100
320-23633-2	168386	110	116	104	106	104
320-23633-3	168378	105	107	96	100	96
320-23633-4	168157	98	108	93	92	94
LCS 320-140118/2-A	Lab Control Sample	95	105	90	90	90
LCSD 320-140118/3-A	Lab Control Sample Dup	101	110	92	100	95
MB 320-140118/1-A	Method Blank	100	109	93	95	94

Surrogate Legend

¹⁸O₂ PFHxS = ¹⁸O₂ PFHxS
¹³C₄-PFHpA = ¹³C₄-PFHpA
¹³C₄ PFOA = ¹³C₄ PFOA
¹³C₄ PFOS = ¹³C₄ PFOS
¹³C₅ PFNA = ¹³C₅ PFNA

QC Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-140118/1-A

Matrix: Water

Analysis Batch: 140483

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 140118

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	. D		2L0	0L92	ng/N		12/01/16 04:5x	12/03/16 0x:05	1
Perfluorohexanesulfonic acid (PF8 HS)	. D		2L0	0L47	ng/N		12/01/16 04:5x	12/03/16 0x:05	1
Perfluoroheptanoic acid (PF8 pA)	. D		2L0	0L40	ng/N		12/01/16 04:5x	12/03/16 0x:05	1
Perfluorooctanoic acid (PFOA)	. D		2L0	0L75	ng/N		12/01/16 04:5x	12/03/16 0x:05	1
Perfluorooctanesulfonic acid (PFOS)	. D		2L0	1L3	ng/N		12/01/16 04:5x	12/03/16 0x:05	1
Perfluorononanoic acid (PF. A)	. D		2L0	0L65	ng/N		12/01/16 04:5x	12/03/16 0x:05	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	100		25 - 150	12/01/16 08:54	12/03/16 04:05	1
13C4-PFHpA	109		25 - 150	12/01/16 08:54	12/03/16 04:05	1
13C4 PFOA	93		25 - 150	12/01/16 08:54	12/03/16 04:05	1
13C4 PFOS	95		25 - 150	12/01/16 08:54	12/03/16 04:05	1
13C5 PFNA	94		25 - 150	12/01/16 08:54	12/03/16 04:05	1

Lab Sample ID: LCS 320-140118/2-A

Matrix: Water

Analysis Batch: 140483

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 140118

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	17L7	19L0		ng/N		104	55 - 1x7
Perfluorohexanesulfonic acid (PF8 HS)	14L2	14L3		ng/N		101	54 - 134
Perfluoroheptanoic acid (PF8 pA)	20L0	20L3		ng/N		102	63 - 135
Perfluorooctanoic acid (PFOA)	20L0	19L7		ng/N		99	63 - 1x1
Perfluorooctanesulfonic acid (PFOS)	14L6	17L9		ng/N		96	x7 - 162
Perfluorononanoic acid (PF. A)	20L0	19L9		ng/N		99	71 - 1x0

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	95		25 - 150
13C4-PFHpA	105		25 - 150
13C4 PFOA	90		25 - 150
13C4 PFOS	90		25 - 150
13C5 PFNA	90		25 - 150

Lab Sample ID: LCSD 320-140118/3-A

Matrix: Water

Analysis Batch: 140483

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 140118

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17L7	14L4		ng/N		106	55 - 1x7	1	30
Perfluorohexanesulfonic acid (PF8 HS)	14L2	17L5		ng/N		96	54 - 134	5	30
Perfluoroheptanoic acid (PF8 pA)	20L0	19L6		ng/N		94	63 - 135	x	30
Perfluorooctanoic acid (PFOA)	20L0	19L4		ng/N		99	63 - 1x1	0	30
Perfluorooctanesulfonic acid (PFOS)	14L6	16L2		ng/N		47	x7 - 162	10	30
Perfluorononanoic acid (PF. A)	20L0	19L4		ng/N		99	71 - 1x0	0	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson

Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1

SDG: 31-1-11735-007

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
<i>18O2 PFHxS</i>	101		25 - 150
<i>13C4-PFHpA</i>	110		25 - 150
<i>13C4 PFOA</i>	92		25 - 150
<i>13C4 PFOS</i>	100		25 - 150
<i>13C5 PFNA</i>	95		25 - 150

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QC Association Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

LCMS

Prep Batch: 140118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23633-1	168491	Total/NA	Water	PFAS Prep	
320-23633-2	168386	Total/NA	Water	PFAS Prep	
320-23633-3	168378	Total/NA	Water	PFAS Prep	
320-23633-4	168157	Total/NA	Water	PFAS Prep	
MB 320-140118/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-140118/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-140118/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 140483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23633-1	168491	Total/NA	Water	PFAS	140118
320-23633-2	168386	Total/NA	Water	PFAS	140118
320-23633-3	168378	Total/NA	Water	PFAS	140118
320-23633-4	168157	Total/NA	Water	PFAS	140118
MB 320-140118/1-A	Method Blank	Total/NA	Water	PFAS	140118
LCS 320-140118/2-A	Lab Control Sample	Total/NA	Water	PFAS	140118
LCSD 320-140118/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	140118

Lab Chronicle

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Client Sample ID: 168491

Date Collected: 11/15/16 10:30

Date Received: 11/17/16 09:40

Lab Sample ID: 320-23633-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	140118	12/01/16 08:54	CCB	TAL SAC
Total/NA	Analysis	PFAS		1			140483	12/03/16 05:00	SER	TAL SAC

Client Sample ID: 168386

Date Collected: 11/15/16 15:10

Date Received: 11/17/16 09:40

Lab Sample ID: 320-23633-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	140118	12/01/16 08:54	CCB	TAL SAC
Total/NA	Analysis	PFAS		1			140483	12/03/16 05:18	SER	TAL SAC

Client Sample ID: 168378

Date Collected: 11/15/16 15:38

Date Received: 11/17/16 09:40

Lab Sample ID: 320-23633-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	140118	12/01/16 08:54	CCB	TAL SAC
Total/NA	Analysis	PFAS		1			140483	12/03/16 05:37	SER	TAL SAC

Client Sample ID: 168157

Date Collected: 11/15/16 12:33

Date Received: 11/17/16 09:40

Lab Sample ID: 320-23633-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	140118	12/01/16 08:54	CCB	TAL SAC
Total/NA	Analysis	PFAS		1			140483	12/03/16 05:55	SER	TAL SAC

Laboratory References:

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

Certification Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Laboratory: TestAmerica Sacramento

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

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

Method Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Method	Method Description	Protocol	Laboratory
PFAS	Perfluorinated Alkyl Substances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23633-1
SDG: 31-1-11735-007

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23633-1	168491	Water	11/15/16 10:30	11/17/16 09:40
320-23633-2	168386	Water	11/15/16 15:10	11/17/16 09:40
320-23633-3	168378	Water	11/15/16 15:38	11/17/16 09:40
320-23633-4	168157	Water	11/15/16 12:33	11/17/16 09:40

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309


CHAIN-OF-CUSTODY RECORD

Page i of 1

Laboratory Test America
Attn: David Atucker

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Hg UCLP PFCS (WS-LC-0625)				Total Number of Containers	Remarks/Matrix
168491		1030	11/15/16	X	Q					2	Groundwater
168386		1510	11/15/16	X	Q					2	" "
168378		1538	11/15/16	X	Q					2	" "
168157		1233	11/15/16	X	Q					4 2	Extra volume



320-23633 Chain of Custody



320-23633 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: 31-1-11735-007	Total Number of Containers: 10	COC Seals/Intact? Y/N/NA: —		Signature: M. Nadel Time: 0930		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: Rag Fire Train (tr)	Received Good Cond./Cold: —	Delivery Method: FedEx		Printed Name: Marcy Nadel Date: 11/16/16		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: E MDN		Delivery Method: FedEx		Company: Shannon & Wilson		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	(attach shipping bill, if any)								
Sampler: TXG									
Instructions		Received By: 1.		Received By: 2.		Received By: 3.			
Requested Turnaround Time: Standard		Signature: W. Shockey Time: 0940		Signature: _____ Time: _____		Signature: _____ Time: _____			
Special Instructions: Please notify upon arrival of shipment		Printed Name: Wesley Shockey Date: 11/17/16		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____			
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File		Company: TAW		Company: _____		Company: _____			

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

No. 34252

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-23633-1

SDG Number: 31-1-11735-007

Login Number: 23633

List Number: 1

Creator: Turpen, Troy

List Source: TestAmerica Sacramento

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

Laboratory Data Review Checklist

Completed by: Marcy Nadel

Title: Geologist Date: December 08, 2016

CS Report Name: City of Fairbanks Fire Training Area Report Date: December 08, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-23633-1

ADEC File Number: 102.38.182 ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 ☒ NA (Please explain.) Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Correct analyses requested?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The temperature blank or cooler was measured within the acceptable temperature range of 0°C to 6°C upon receipt at the laboratory, as specified in the EPA publication SW-846. This range has been approved by ADEC.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒Yes ☐No ☐NA (Please explain.)

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☐Yes ☐No ☒NA (Please explain.)

Comments:

There were no discrepancies identified by the laboratory.

- e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

4. Case Narrative

- a. Present and understandable?

☒Yes ☐No ☐NA (Please explain.)

Comments:

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

The case narrative noted the following discrepancies associated with samples in this WO:

-The laboratory noted that there was an LCS recovery failure in preparation batch 320-139615 and analytical batch 320-139773. However preparation batch 320-139615 and analytical batch 320-139773 are not associated with this WO.

-The laboratory noted that there was insufficient sample volume to analyze a matrix spike (MS) and matrix spike duplicate (MSD) samples for the samples associated with preparation batch 320-140118.

- c. Were all corrective actions documented?

☐Yes ☐No ☒NA (Please explain.)

Comments:

The laboratory did not state that any corrective actions were required.

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

The laboratory did not specify any effect on data quality or usability.

Comments:

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

- c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Soil samples were not submitted with this work order.

- d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The PQL, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

- e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

- a. Method Blank

- i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- iii. If above PQL, what samples are affected?

PFCs were not detected in MB 320-140118/1-A.

Comments:

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were 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 ☐ NA (Please explain.)

Comments:

LCS/LCSD sample results were reported.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries were within the ranges required by the laboratory method.

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 ☐ NA (Please explain.)

Comments:

The RPDs were within the laboratory limit of 30%. The maximum RPD was 10%.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Percent recoveries for surrogates are within the laboratory limits of 25% to 150%.

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

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

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 ☒ NA (Please explain.)

Comments:

PFCs are not volatile compounds, so a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC?
(If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required; see above.

- iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required.

- iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required.

- v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

ii. Submitted blind to lab?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

A field-duplicate pair was not submitted with this WO; however, field duplicates are submitted at the appropriate frequency for the overall project.

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 ☒ NA (Please explain.) Comments:

A field-duplicate pair was not submitted with this WO.

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

Comments:

The data quality and usability were not affected; see above.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Reusable equipment was not utilized during sample collection for this WO; therefore an equipment blank is not required.

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

An equipment blank was not submitted with this WO.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

There were no other data qualifiers used.

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-23892-1

TestAmerica Sample Delivery Group: 31-1-11735-007

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

12/15/2016 7:05:14 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23892-1
SDG: 31-1-11735-007

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23892-1
SDG: 31-1-11735-007

Job ID: 320-23892-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-23892-1

Receipt

The samples were received on 11/30/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.4° C.

LCMS

Method(s) PFAS: The samples were analyzed by the direct injection method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 1.9 "Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissue".

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-140119.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-140842.

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

Detection Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23892-1
SDG: 31-1-11735-007

Client Sample ID: 167487

Lab Sample ID: 320-23892-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.94	J	2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.1		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	0.87	J	2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.4	J	2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168645

Lab Sample ID: 320-23892-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	8.3		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	39		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.6		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	10		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	94		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.85	J	2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 569356

Lab Sample ID: 320-23892-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.1		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	14		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.88	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	2.9		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	17		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23892-1
SDG: 31-1-11735-007

Client Sample ID: 167487

Date Collected: 11/28/16 11:07

Date Received: 11/30/16 09:30

Lab Sample ID: 320-23892-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.94	J	2.0	0.92	ng/L		12/01/16 09:00	12/03/16 02:51	1
Perfluorohexanesulfonic acid (PFHxS)	4.1		2.0	0.87	ng/L		12/01/16 09:00	12/03/16 02:51	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		12/01/16 09:00	12/03/16 02:51	1
Perfluorooctanoic acid (PFOA)	0.87	J	2.0	0.75	ng/L		12/01/16 09:00	12/03/16 02:51	1
Perfluorooctanesulfonic acid (PFOS)	1.4	J	2.0	1.3	ng/L		12/01/16 09:00	12/03/16 02:51	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/01/16 09:00	12/03/16 02:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	102		24 5140				12-01-1/ 06:00	12-03-1/ 02:41	1
13Cp PFHA9	110		24 5140				12-01-1/ 06:00	12-03-1/ 02:41	1
13Cp PFO9	103		24 5140				12-01-1/ 06:00	12-03-1/ 02:41	1
13Cp PFOS	6N		24 5140				12-01-1/ 06:00	12-03-1/ 02:41	1
13C4 PF79	64		24 5140				12-01-1/ 06:00	12-03-1/ 02:41	1

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23892-1
SDG: 31-1-11735-007

Client Sample ID: 168645

Date Collected: 11/28/16 11:45

Date Received: 11/30/16 09:30

Lab Sample ID: 320-23892-2

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	8.3		2.0	0.92	ng/L		12/01/16 09:00	12/03/16 03:10	1
Perfluorohexanesulfonic acid (PFHxS)	39		2.0	0.87	ng/L		12/01/16 09:00	12/03/16 03:10	1
Perfluoroheptanoic acid (PFHpA)	5.6		2.0	0.80	ng/L		12/01/16 09:00	12/03/16 03:10	1
Perfluorooctanoic acid (PFOA)	10		2.0	0.75	ng/L		12/01/16 09:00	12/03/16 03:10	1
Perfluorooctanesulfonic acid (PFOS)	94		2.0	1.3	ng/L		12/01/16 09:00	12/03/16 03:10	1
Perfluorononanoic acid (PFNA)	0.85	J	2.0	0.65	ng/L		12/01/16 09:00	12/03/16 03:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	102		24 5140				12-01-1/ 06:00	12-03-1/ 03:10	1
13Cp PFHxS	104		24 5140				12-01-1/ 06:00	12-03-1/ 03:10	1
13Cp PFO9	63		24 5140				12-01-1/ 06:00	12-03-1/ 03:10	1
13Cp PFOS	6/		24 5140				12-01-1/ 06:00	12-03-1/ 03:10	1
13C4 PF79	6/		24 5140				12-01-1/ 06:00	12-03-1/ 03:10	1

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23892-1
SDG: 31-1-11735-007

Client Sample ID: 569356

Date Collected: 11/28/16 17:25

Date Received: 11/30/16 09:30

Lab Sample ID: 320-23892-3

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.1		2.0	0.92	ng/L		12/01/16 09:00	12/03/16 03:28	1
Perfluorohexanesulfonic acid (PFHxS)	14		2.0	0.87	ng/L		12/01/16 09:00	12/03/16 03:28	1
Perfluoroheptanoic acid (PFHpA)	0.88	J	2.0	0.80	ng/L		12/01/16 09:00	12/03/16 03:28	1
Perfluorooctanoic acid (PFOA)	2.9		2.0	0.75	ng/L		12/01/16 09:00	12/03/16 03:28	1
Perfluorooctanesulfonic acid (PFOS)	17		2.0	1.3	ng/L		12/01/16 09:00	12/03/16 03:28	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/01/16 09:00	12/03/16 03:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		24 5140				12-01-1/ 06:00	12-03-1/ 03:28	1
13Cp5PFHA9	110		24 5140				12-01-1/ 06:00	12-03-1/ 03:28	1
13Cp PFO9	64		24 5140				12-01-1/ 06:00	12-03-1/ 03:28	1
13Cp PFOS	66		24 5140				12-01-1/ 06:00	12-03-1/ 03:28	1
13C4 PF79	68		24 5140				12-01-1/ 06:00	12-03-1/ 03:28	1

Isotope Dilution Summary

IrieSt: h&aSSoS WG iisoS
 j ro/ectyhite: I itf oFkairbaSgs kire TraiSiS4 Area

TestAmerica Job ID: 320-23612-C
 hD7 : 3C-C-CC53P-005

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		3O2 PFHx (25-150)	3C4-PFHp (25-150)	3C4 PFO (25-150)	3C4 PFO (25-150)	3C5 PFN (25-150)
320-23612-C	C95865	002	000	003	15	1P
320-23612-2	C9698P	002	00P	13	19	19
320-23612-3	P913P9	00P	000	1P	11	16
LI h 320-C80CC1y2-A	Lab I oStronh ampre	009	005	11	002	003
LI hD 320-C80CC1y3-A	Lab I oStronh ampre Dup	008	002	11	000	00C
MB 320-C80CC1yC-A	Met&od BræSg	1P	00P	61	61	12

Surrogate Legend

C6O2 j kHxh = C6O2 j kHxh
 C3I 8-j kHpA = C3I 8-j kHpA
 C3I 8 j kOA = C3I 8 j kOA
 C3I 8 j kOh = C3I 8 j kOh
 C3I Pj kNA = C3I Pj kNA

QC Sample Results

LineSt: h&aSSoS WG insoS
j ro/ecthyite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-23612-C
hD7 : 3C-C-CC53P-005

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-140119/1-A

Matrix: Water

Analysis Batch: 140482

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 140119

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j erFidoroobdtaSesdrfoSic aci(B k) h.	LD		290	0912	SuyN		C2y0yC4 01:00	C2y03yC4 0C:0C	C
j erFidoro&exaSesdrfoSic aci(B kHxh.	LD		290	0955	SuyN		C2y0yC4 01:00	C2y03yC4 0C:0C	C
j erFidoro&e8taSoic aci(B kH8A.	LD		290	0960	SuyN		C2y0yC4 01:00	C2y03yC4 0C:0C	C
j erFidoroocctaSoic aci(B kp A.	LD		290	095P	SuyN		C2y0yC4 01:00	C2y03yC4 0C:0C	C
j erFidoroocctaSesdrfoSic aci(B kp h.	LD		290	098	SuyN		C2y0yC4 01:00	C2y03yC4 0C:0C	C
j erFidoroSoSaSoic aci(B kL A.	LD		290	094P	SuyN		C2y0yC4 01:00	C2y03yC4 0C:0C	C

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	04		24 514-	12/- 1/1: - 03 -	12/- 6/1: - 13 1	1
16Cp PFHA9	1- 4		24 514-	12/- 1/1: - 03 -	12/- 6/1: - 13 1	1
16Cp PFO9	80		24 514-	12/- 1/1: - 03 -	12/- 6/1: - 13 1	1
16Cp PFOS	80		24 514-	12/- 1/1: - 03 -	12/- 6/1: - 13 1	1
16C4 PFN9	02		24 514-	12/- 1/1: - 03 -	12/- 6/1: - 13 1	1

Lab Sample ID: LCS 320-140119/2-A

Matrix: Water

Analysis Batch: 140482

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 140119

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
j erFidoroobdtaSesdrfoSic aci(B k) h.	C595	C698		SuyN		000	PP - 005
j erFidoro&exaSesdrfoSic aci(B kHxh.	C692	C598		SuyN		1P	P6 - C36
j erFidoro&e8taSoic aci(B kH8A.	2090	C190		SuyN		15	43 - C3P
j erFidoroocctaSoic aci(B kp A.	2090	C198		SuyN		14	43 - 00C
j erFidoroocctaSesdrfoSic aci(B kp h.	C694	C49C		SuyN		65	C5 - C42
j erFidoroSoSaSoic aci(B kL A.	2090	C69P		SuyN		13	5C - 000

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	1- :		24 514-
16Cp PFHA9	117		24 514-
16Cp PFO9	00		24 514-
16Cp PFOS	1- 2		24 514-
16C4 PFN9	1- 6		24 514-

Lab Sample ID: LCSD 320-140119/3-A

Matrix: Water

Analysis Batch: 140482

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 140119

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
j erFidoroobdtaSesdrfoSic aci(B k) h.	C595	C194		SuyN		00C	PP - 005	4	30
j erFidoro&exaSesdrfoSic aci(B kHxh.	C692	C695		SuyN		003	P6 - C36	6	30
j erFidoro&e8taSoic aci(B kH8A.	2090	2C92		SuyN		004	43 - C3P	1	30
j erFidoroocctaSoic aci(B kp A.	2090	2C9C		SuyN		00P	43 - 00C	1	30
j erFidoroocctaSesdrfoSic aci(B kp h.	C694	C690		SuyN		15	C5 - C42	0C	30
j erFidoroSoSaSoic aci(B kL A.	2090	2090		SuyN		002	5C - 000	00	30

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS WG iisoS

j ro/ectyhite: I itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-23612-C

hD7 : 3C-C-CC53P-005

LCSD LCSD		
Isotope Dilution	%Recovery	Qualifier
18O2 PFHxS	1-p	24 514-
16Cp PFHA9	112	24 514-
16Cp PFO9	00	24 514-
16Cp PFOS	1--	24 514-
16C4 PFN9	1-1	24 514-

1

2

3

4

5

6

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11

12

13

14

15

TestAmerica hacrameSto

QC Association Summary

LineSt: h&aSSoS WG iisoS
j ro/ectyhite: I itf oFkairbaSgs kire TraiSiSp Area

TestAmerica Job ID: 320-23612-C
hD7 : 3C-C-CC53P-005

LCMS

Prep Batch: 140119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23612-C	C45965	TotalNA	Gater	j kAh j re8	
320-23612-2	C4649P	TotalNA	Gater	j kAh j re8	
320-23612-3	P413P4	TotalNA	Gater	j kAh j re8	
MB 320-C90CC1yC-A	Met&od BræSg	TotalNA	Gater	j kAh j re8	
LI h 320-C90CC1y2-A	Lab I oStronham8re	TotalNA	Gater	j kAh j re8	
LI hD 320-C90CC1y8-A	Lab I oStronham8re Du8	TotalNA	Gater	j kAh j re8	

Analysis Batch: 140482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23612-C	C45965	TotalNA	Gater	j kAh	C90CC1
320-23612-2	C4649P	TotalNA	Gater	j kAh	C90CC1
320-23612-3	P413P4	TotalNA	Gater	j kAh	C90CC1
MB 320-C90CC1yC-A	Met&od BræSg	TotalNA	Gater	j kAh	C90CC1
LI h 320-C90CC1y2-A	Lab I oStronham8re	TotalNA	Gater	j kAh	C90CC1
LI hD 320-C90CC1y8-A	Lab I oStronham8re Du8	TotalNA	Gater	j kAh	C90CC1

Lab Chronicle

Client: Shannon & Wilson
j ro/ectySite: Citf oFkairbangs kire TraininGArea

TestAmerica Job ID: 320-23612-P
SD7 : 3P-P-PP53p-005

Client Sample ID: 168498

Date Collecte/ : 11/29/16 11:08

Date Receive/ : 11/30/16 0M30

Lab Sample ID: 320-239M2-1

x atriW d ater

Brep 7Tpe	yatch 7Tpe	yatch x etho/	Rsn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepare/ or PnalTue/	PnalTA	Lab
Totaly A	j reB	j kAS j reB			PB0 mL	PB4 mL	PNDPP1	P2y0P4 01:00	CC8	TAL SAC
Totaly A	Analf sis	j kAS		P			PNDN62	P2y03yP4 02:pP	C8W	TAL SAC

Client Sample ID: 16964N

Date Collecte/ : 11/29/16 11:4N

Date Receive/ : 11/30/16 0M30

Lab Sample ID: 320-239M2-2

x atriW d ater

Brep 7Tpe	yatch 7Tpe	yatch x etho/	Rsn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepare/ or PnalTue/	PnalTA	Lab
Totaly A	j reB	j kAS j reB			PB0 mL	PB4 mL	PNDPP1	P2y0P4 01:00	CC8	TAL SAC
Totaly A	Analf sis	j kAS		P			PNDN62	P2y03yP4 03:P0	C8W	TAL SAC

Client Sample ID: N6M3N6

Date Collecte/ : 11/29/16 18:2N

Date Receive/ : 11/30/16 0M30

Lab Sample ID: 320-239M2-3

x atriW d ater

Brep 7Tpe	yatch 7Tpe	yatch x etho/	Rsn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepare/ or PnalTue/	PnalTA	Lab
Totaly A	j reB	j kAS j reB			PB0 mL	PB4 mL	PNDPP1	P2y0P4 01:00	CC8	TAL SAC
Totaly A	Analf sis	j kAS		P			PNDN62	P2y03yP4 03:26	C8W	TAL SAC

LaboratorT ReferenceA:

TAL SAC RTestAmerica Sacramento=660 , iverside j argwaf =West Sacramento=CA 1p40p=T9L (1P4)353-p400

Certification Summary

Client: Shannon & Wilson
 j ro/ectySite: Citf oFkairbangs kire TraininGArea

TestAmerica Job ID: 320-23612-P
 SD7 : 3P-P-PP53d-005

Laboratory: TestAmerica Sacramento

All certifications hel. bf this laboratorf are liste. Np of all certifications are aLLlicable to this reLortN

Authority	Program	EPA Region	Certification ID	Expiration Date
A29A	DoD 89Aj		2126-0P	0P-3P-P5
Alasga & STU	State j roGam	P0	(ST-0dd	P2-P6-P5
Ari) ona	State j roGam	1	Az0506	06-PP-P5
Argansas D8Z	State j roGam	Q	66-0Q1P	0Q-P5-P5
Califørnia	State j roGam	1	2615	0P-3P-P6
Colora. o	State j roGam	6	CA00044	06-3P-P5
Connecticut	State j roGam	P	j H-0Q1P	0Q30-P5
klori. a	p 89Aj	4	865d50	0Q30-P5
Hawaii	State j roGam	1	p yA	0P-3P-P5
Illinois	p 89Aj	d	2000QD	03-P5-P5
Kansas	p 89Aj	5	8-P035d	P0-3P-P5
9ouisiana	p 89Aj	Q	30QP2	0Q30-P5
Maine	State j roGam	P	CA0004	04-P6-P6
MichiGan	State j roGam	d	1145	0P-3P-P6
p eva. a	State j roGam	1	CA00044	05-3P-P5
p ew Jersef	p 89Aj	2	CA00d	0Q30-P5
p ew Yorg	p 89Aj	2	PPQQQ	04-0P-P5
OreGon	p 89Aj	P0	4040	0P-21-P5
j ennsf Ivania	p 89Aj	3	Q6-0P252	03-3P-P5
Texas	p 89Aj	Q	TP04504311	05-3P-P5
(S kish & Wil. lifè	ke. eral		98 P46366-0	P0-3P-P5
(SDA	ke. eral		j 330-PP-0043Q	P2-30-P5
(S8j A (CMR	ke. eral	P	CA00044	PP-0Q-P6
(tah	p 89Aj	6	CA00044	02-26-P5
VirGnia	p 89Aj	3	4QD256	03-P4-P5
WashinGon	State j roGam	P0	Cd6P	0d-0d-P5
West VirGnia EDWU	State j roGam	3	1130C	P2-3P-PQ
Wf ominG	State j roGam	6	6TMS-9	0P-21-P5

Method Summary

LineSt: h&aSSoS WG i&soS
j ro/ectyhite: l itf oFkairbaSgs kire TraiSiSL Area

TestAmerica Job ID: 320-23612-C
hD7 : 3C-C-CC53P-005

Method	Method Description	Protocol	Laboratory
j kAh	j erffloriSate= Angf nh dbstaSces	TAu-hAl	TAu hAl

Protocol References:

TAu-hAl , TestAmerica uaboratoriesCG est hacrameStoCkacintf htaS=ar= p . eratiSL j roce=dre8

Laboratory References:

TAu hAl , TestAmerica hacrameStoC660 Riversi=e j argwaf CG est hacrameStoC A 1P90POTEu (1C9)353-P900

Sample Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23892-1
SDG: 31-1-11735-007

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23892-1	167487	Water	11/28/16 11:07	11/30/16 09:30
320-23892-2	168645	Water	11/28/16 11:45	11/30/16 09:30
320-23892-3	569356	Water	11/28/16 17:25	11/30/16 09:30



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CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Test America
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	PKS XG (WS-LC-0025)						Total Number of Containers	Remarks/Matrix
167487		1107	11/28/16	X	X							2	groundwater
168645		1145	↓	X	X							2	↓
569356		1725	↓	X	X							2	↓



320-23892 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735</u>		Total Number of Containers: <u>6</u>		Signature: <u>M. Nadel</u> Time: <u>1900</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>C&P Reg Fire Tr. Can</u>		COC Seals/Intact? Y/N/NA: <u>—</u>		Printed Name: <u>Marcy Nadel</u> Date: <u>11/29/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN</u>		Received Good Cond./Cold: <u>—</u>		Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>FedEx</u>		Received By: 1.		Received By: 2.		Received By: 3.	
Sampler: <u>MDN</u>		(attach shipping bill, if any)		Signature: <u>Jim D. Turner</u> Time: <u>09:30</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Instructions				Printed Name: <u>Thy G. Turner</u> Date: <u>11/30/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Requested Turnaround Time: <u>Standard</u>				Company: <u>TAS</u> <u>7.3°C sel rec</u>		Company: _____		Company: _____	
Special Instructions: <u>Please bill to 31-1-11735-007</u>									
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File									

No. 34494

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-23892-1

SDG Number: 31-1-11735-007

Login Number: 23892

List Number: 1

Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	2 small gel packs
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Laboratory Data Review Checklist

Completed by:

Title: Date:

CS Report Name: Report Date:

Consultant Firm:

Laboratory Name: Laboratory Report Number:

ADEC File Number: ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 ☒ NA (Please explain.) Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Correct analyses requested?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
☐ Yes ☒ No ☐ NA (Please explain.) Comments:

The cooler and sample temperature was measured in two ways upon receipt at the laboratory. The standard thermometer internal cooler reading was outside the acceptable temperature range of 0°C to 6°C (7.3°C , listed on COC). The infrared thermometer water sample reading was inside the acceptable temperature range (3.4°C , listed on job narrative).

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒Yes ☐No ☐NA (Please explain.)

Comments:

Analysis of PFCs does not require a preservative other than temperature control. Per the laboratory project manager “the IR (infrared) thermometer recording of the actual sample is more realistic” of the temperature of the samples upon receipt. We therefore consider the sample/cooler temperature upon receipt at the laboratory to be within the acceptable temperature range.

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒Yes ☐No ☐NA (Please explain.)

Comments:

Conflicting cooler and sample temperature readings are documented on the COC, sample receipt form, and job narrative. The temperature discrepancy was clarified by the laboratory project manager via email on December 16.

- e. Data quality or usability affected? (Please explain.)

Comments:

See above; the data quality and usability were not affected.

4. Case Narrative

- a. Present and understandable?

☒Yes ☐No ☐NA (Please explain.)

Comments:

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

The laboratory noted that there was insufficient sample volume to analyze a matrix spike (MS) and matrix spike duplicate (MSD) samples for the samples associated with preparation batch 320-140119 and analysis batch 320-140842.

- c. Were all corrective actions documented?

☐Yes ☐No ☒NA (Please explain.)

Comments:

The laboratory did not state that any corrective actions were required.

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

Comments:

The laboratory did not specify any effect on data quality or usability.

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

- c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Soil samples were not submitted with this work order.

- d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The PQL, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

- e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

- a. Method Blank

- i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- iii. If above PQL, what samples are affected?

Comments:

PFCs were not detected in MB 320-140119/1-A.

- iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Qualification of the results was not required; see above.

- v. Data quality or usability affected? (Please explain.)
Comments:

The data quality and usability were 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 ☐ NA (Please explain.) Comments:

LCS/LCSD sample results were reported.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Metals and inorganics were not analyzed as part of this work order.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Percent recoveries were within the ranges required by the laboratory method.

- 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 ☐ NA (Please explain.) Comments:

The RPDs were within the laboratory limit of 30%. The maximum RPD for this WO was 11%.

- v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The IDA percent recoveries are within the laboratory limits of 25% to 150%.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

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 ☒ NA (Please explain.)

Comments:

PFCs are not volatile compounds, so a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required; see above.

iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required.

iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality were not affected.

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

ii. Submitted blind to lab?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO; however, field duplicates are submitted at the appropriate frequency for the overall project.

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 ☒ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO.

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

Comments:

The data quality and usability were not affected; see above.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Reusable equipment was not utilized during sample collection for this WO; therefore an equipment blank is not required.

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

An equipment blank was not submitted with this WO.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

There were no other data qualifiers used.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-24461-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

12/29/2016 7:34:29 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Job ID: 320-24461-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-24461-1

Receipt

The samples were received on 12/16/2016 10:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.6° C.

LCMS

Method(s) PFAS: The samples were analyzed by the direct injection method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.0 "Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissue".

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-143642. A Laboratory Control Sample Duplicate (LCSD) was extracted with the batch to demonstrate batch precision.

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

Detection Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Client Sample ID: 407429-D

Lab Sample ID: 320-24461-1

No Detections.

Client Sample ID: 168106

Lab Sample ID: 320-24461-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.4		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	20		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.2		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	5.0		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.7		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Client Sample ID: 407429-D

Date Collected: 12/14/16 13:22

Date Received: 12/16/16 10:05

Lab Sample ID: 320-24461-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		12/23/16 06:45	12/23/16 17:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		12/23/16 06:45	12/23/16 17:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	103		25 - 150				12/23/16 06:45	12/23/16 17:11	1
13C4 PFOS	103		25 - 150				12/23/16 06:45	12/23/16 17:11	1

Client Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Client Sample ID: 168106

Date Collected: 12/14/16 17:16

Date Received: 12/16/16 10:05

Lab Sample ID: 320-24461-2

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.4		2.0	0.92	ng/L		12/23/16 06:45	12/23/16 18:06	1
Perfluorohexanesulfonic acid (PFHxS)	20		2.0	0.87	ng/L		12/23/16 06:45	12/23/16 18:06	1
Perfluoroheptanoic acid (PFHpA)	2.2		2.0	0.80	ng/L		12/23/16 06:45	12/23/16 18:06	1
Perfluorooctanoic acid (PFOA)	5.0		2.0	0.75	ng/L		12/23/16 06:45	12/23/16 18:06	1
Perfluorooctanesulfonic acid (PFOS)	7.7		2.0	1.3	ng/L		12/23/16 06:45	12/23/16 18:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		12/23/16 06:45	12/23/16 18:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	103		25 - 150				12/23/16 06:45	12/23/16 18:06	1
13C4-PFHpa	121		25 - 150				12/23/16 06:45	12/23/16 18:06	1
13C4 PFOA	107		25 - 150				12/23/16 06:45	12/23/16 18:06	1
13C4 PFOS	104		25 - 150				12/23/16 06:45	12/23/16 18:06	1
13C5 PFNA	116		25 - 150				12/23/16 06:45	12/23/16 18:06	1

TestAmerica Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		8COPFH/ (25-150)	8COPFH/ (25-150)	3H2 PF4 x (25-150)	3COPF4 p (25-150)	8C5 PFN/ (25-150)
320-24461-1	407429-D	103	103			
320-24461-2	168106	107	104	103	121	116
LCS 320-143642/2-A	Lab Control Sample	102	105	105	121	106
LCSD 320-143642/3-A	Lab Control Sample Dup	100	103	102	117	106
MB 320-143642/1-A	Method Blank	88	91	90	106	90

Surrogate Legend

13C4 PFOA = 13C4 PFOA
13C4 PFOS = 13C4 PFOS
18O2 PFHxS = 18O2 PFHxS
13C4-PFHpA = 13C4-PFHpA
13C5 PFNA = 13C5 PFNA

QC Sample Results

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-143642/1-A

Matrix: Water

Analysis Batch: 143732

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 143642

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PerflNrobnNanesNfonic aci. uPFdS(	BD		2)0	0)L2	ng/9		12/23/16 06:4x	12/23/16 1x:02	1
PerflNrohe7anesNfonic aci. uPFp 7S(	BD		2)0	0)H8	ng/9		12/23/16 06:4x	12/23/16 1x:02	1
PerflNroheQanoic aci. uPFp OA(	BD		2)0	0)H0	ng/9		12/23/16 06:4x	12/23/16 1x:02	1
PerflNrooctanoic aci. uPF5 A(	BD		2)0	0)8x	ng/9		12/23/16 06:4x	12/23/16 1x:02	1
PerflNrooctanesNfonic aci. uPF5 S(	BD		2)0	1)3	ng/9		12/23/16 06:4x	12/23/16 1x:02	1
PerflNrononanoic aci. uPFBA(	BD		2)0	0)6x	ng/9		12/23/16 06:4x	12/23/16 1x:02	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	04		25 - 154	12/26/1: 4: 3C5	12/26/1: 153#2	1
16p C-PFHA9	14:		25 - 154	12/26/1: 4: 3C5	12/26/1: 153#2	1
16p CPFO9	88		25 - 154	12/26/1: 4: 3C5	12/26/1: 153#2	1
16p CPFOS	01		25 - 154	12/26/1: 4: 3C5	12/26/1: 153#2	1
16p 5 PFN9	04		25 - 154	12/26/1: 4: 3C5	12/26/1: 153#2	1

Lab Sample ID: LCS 320-143642/2-A

Matrix: Water

Analysis Batch: 143732

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 143642

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
PerflNrobnNanesNfonic aci. uPFdS(	18)8	16)0		ng/9		L1	xx - 148
PerflNrohe7anesNfonic aci. uPFp 7S(	1H)2	1x)6		ng/9		H6	xH- 13H
PerflNroheQanoic aci. uPFp OA(	20)0	18)0		ng/9		Hx	63 - 13x
PerflNrooctanoic aci. uPF5 A(	20)0	18)4		ng/9		H8	63 - 141
PerflNrooctanesNfonic aci. uPF5 S(	1H)6	1x)1		ng/9		H1	48 - 162
PerflNrononanoic aci. uPFBA(	20)0	16)0		ng/9		H0	81 - 140

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	145		25 - 154
16p C-PFHA9	121		25 - 154
16p CPFO9	142		25 - 154
16p CPFOS	145		25 - 154
16p 5 PFN9	14:		25 - 154

Lab Sample ID: LCSD 320-143642/3-A

Matrix: Water

Analysis Batch: 143732

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 143642

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
PerflNrobnNanesNfonic aci. uPFdS(	18)8	16)4		ng/9		L3	xx - 148	2	30
PerflNrohe7anesNfonic aci. uPFp 7S(	1H)2	1x)L		ng/9		HH	xH- 13H	2	30
PerflNroheQanoic aci. uPFp OA(	20)0	16)H		ng/9		H4	63 - 13x	1	30
PerflNrooctanoic aci. uPF5 A(	20)0	18)0		ng/9		Hx	63 - 141	2	30
PerflNrooctanesNfonic aci. uPF5 S(	1H)6	1x)1		ng/9		H1	48 - 162	0	30
PerflNrononanoic aci. uPFBA(	20)0	18)2		ng/9		H6	81 - 140	H	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson

Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
18O2 PFHxS	142		25 - 154
16p C-PFHA9	117		25 - 154
16p CPFO9	144		25 - 154
16p CPFOS	146		25 - 154
16p 5 PFN9	14:		25 - 154

QC Association Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

LCMS

Prep Batch: 143642

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24461-1	407429-D	Total/NA	Water	PFAS Prep	
320-24461-2	168106	Total/NA	Water	PFAS Prep	
MB 320-143642/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-143642/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-143642/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 143732

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24461-1	407429-D	Total/NA	Water	PFAS	143642
320-24461-2	168106	Total/NA	Water	PFAS	143642
MB 320-143642/1-A	Method Blank	Total/NA	Water	PFAS	143642
LCS 320-143642/2-A	Lab Control Sample	Total/NA	Water	PFAS	143642
LCSD 320-143642/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	143642

Lab Chronicle

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Client Sample ID: 1681493D

Date Collected: - 4/- 1/- 0 - 2:44

Date Received: - 4/- 0/- 0 - 6:6v

Lab Sample ID: 24634110- 3

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	143642	12/23/16 06:45	CCB	TAL SAC
Total/NA	Analysis	PFAS		1			143732	12/23/16 17:11	SER	TAL SAC

Client Sample ID: - 0N- 60

Date Collected: - 4/- 1/- 0 - 8:- 0

Date Received: - 4/- 0/- 0 - 6:6v

Lab Sample ID: 24634110- 34

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	143642	12/23/16 06:45	CCB	TAL SAC
Total/NA	Analysis	PFAS		1			143732	12/23/16 18:06	SER	TAL SAC

Laboratory Reference:

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

Certification Summary

Client: Shannon & Wilson
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-24461-1

Laboratory: TestAmerica Sacramento

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

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

* Certification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson

TestAmerica Job ID: 320-24461-1

Project/Site: City of Fairbanks Fire Training Area

Method	Method Description	Protocol	Laboratory
PFAS	Perfluorinated Alkyl Substances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson

TestAmerica Job ID: 320-24461-1

Project/Site: City of Fairbanks Fire Training Area

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-24461-1	407429-D	Water	12/14/16 13:22	12/16/16 10:05
320-24461-2	168106	Water	12/14/16 17:16	12/16/16 10:05

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

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St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test America
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

Project Information		Sample Receipt	
Project Number: <u>31-111735</u>	Total Number of Containers: <u>4</u>		
Project Name: <u>GF Rq FIRE T. Cont</u>	COC Seals/Intact? Y/N/NA: <u>—</u>		
Contact: <u>MDN</u>	Received Good Cond./Cold: <u>—</u>		
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: <u>FedEx</u>		
Sampler: <u>MDN</u>	(attach shipping bill, if any)		
Instructions			
Requested Turnaround Time: <u>Standard</u>			
Special Instructions: <u>Please bill to 31-111735-007</u>			
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File			

Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Signature: <u>M. Nadel</u>	Time: <u>0930</u>	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: <u>Marcy Nadel</u>	Date: <u>12/15/16</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Received By: 1.		Received By: 2.		Received By: 3.	
Signature: <u>[Signature]</u>	Time: <u>1005</u>	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: <u>Tony G. Tarpen</u>	Date: <u>12/16/16</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: <u>THS</u>	<u>5.6°C</u> <u>901 fee</u>	Company: _____		Company: _____	

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-24461-1

Login Number: 24461

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

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

Laboratory Data Review Checklist

Completed by: Tiffany Green

Title: Environmental Scientist Date: January 03, 2017

CS Report Name: City of Fairbanks Fire Training Area Report Date: December 29, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-24461-1

ADEC File Number: 102.38.182 ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 ☒ NA (Please explain.) Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Correct analyses requested?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The cooler temperature was 5.6°C upon receipt at the laboratory, which is within the U.S. Environmental Protection Agency's acceptable range of 0°C to 6°C , as noted in their Hazardous Waste Test Methods document SW-846.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒Yes ☐No ☐NA (Please explain.)

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

The sample-receipt form notes the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☐Yes ☒No ☐NA (Please explain.)

Comments:

There were no discrepancies noted by the laboratory.

- e. Data quality or usability affected? (Please explain.)

Comments:

See above; the data quality and usability were unaffected.

4. Case Narrative

- a. Present and understandable?

☒Yes ☐No ☐NA (Please explain.)

Comments:

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

The laboratory noted that there was insufficient sample volume to analyze a matrix spike (MS) and matrix spike duplicate (MSD) samples for the samples associated with preparation batch 320-143642.

- c. Were all corrective actions documented?

☐Yes ☐No ☒NA (Please explain.)

Comments:

The laboratory did not state that any corrective actions were required.

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

Comments:

The laboratory did not specify any effect on data quality or usability.

5. Samples Results

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Soil samples were not submitted with this work order.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The PQL, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC groundwater-cleanup levels for perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA).

e. Data quality or usability affected?

Comments:

The data quality and usability were unaffected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Comments:

No samples were affected; perfluorinated compounds (PFCs) were not detected in method blank MB 320-143624/1-A.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were unaffected.

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 ☐ NA (Please explain.)

Comments:

LCS/LCSD sample results were reported.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries were within the ranges required by the laboratory method.

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 ☐ NA (Please explain.)

Comments:

The RPDs were within the laboratory limit of 30%.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The analytical method WS-LC-0025 uses isotope dilution analysis (IDA) recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically labeled compounds are discussed as surrogates for this method.

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The IDA percent recoveries are within the laboratory limits of 25% to 150%.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

The IDA percent recoveries were within the laboratory limits, so qualification of the results was not required; see above.

- iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

The data quality and usability were not affected.

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 ☒ NA (Please explain.)

Comments:

PFCs are not volatile compounds, so a trip blank was not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required; see above.

- iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required.

iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required.

v. Data quality or usability affected? (Please explain.)

Comments:

A trip blank was not required; the data quality was not affected.

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

ii. Submitted blind to lab?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this work order (WO), but field duplicates are submitted at the appropriate frequency for the overall project.

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 ☒ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO.

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

Comments:

The data quality and usability were not affected; see above.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Reusable equipment was not used during sample collection for this WO, so an equipment blank was not required.

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

An equipment blank was not submitted with this WO; see above.

ii. If above PQL, what samples are affected?

Comments:

Not applicable; an equipment blank was not submitted with this WO.

iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were unaffected; see above.

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

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

There were no other data qualifiers used.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-25170-1

TestAmerica Sample Delivery Group: 31-1-11735

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

1/27/2017 12:35:33 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

Job ID: 320-25170-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-25170-1

Receipt

The sample was received on 1/20/2017 9:20 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.6° C.

LCMS

Method(s) PFAS: The sample were analyzed by the direct injection method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.1 "Perfluorinated Compounds (PFCs) in Water, Soild, Sediments, and Tissue": (

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-147397.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

Client Sample ID: 168688

Lab Sample ID: 320-25170-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.5	J	2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.8		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.5	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	3.3		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.7		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

Client Sample ID: 149499

Date Collected: 01/10/18 13:19

Date Received: 01/20/18 0v:20

Lab Sample ID: 320-26180-1

Matrix: Water

Met7od: hPFS - herAuorinated F l f kl Substances

F nalkte	Result	Hual i Aer	RL	MDL	Qnit	D	hprepared	F nalkUed	Dil Pac
herAuorobutanesulAonic acid	1)6 z		2.0	0.92	ng/L		01/23/17 10:23	01/25/17 16:42	1
yhP(SB									
herAuoro7exanesulAonic acid	Q9		2.0	0.87	ng/L		01/23/17 10:23	01/25/17 16:42	1
yhP. xSB									
herAuoro7eptanoic acid yhP. pFB	1)6 z		2.0	0.80	ng/L		01/23/17 10:23	01/25/17 16:42	1
herAuorooctanoic acid yhPJ FB	3)3		2.0	0.75	ng/L		01/23/17 10:23	01/25/17 16:42	1
herAuorooctanesulAonic acid	3)8		2.0	1.3	ng/L		01/23/17 10:23	01/25/17 16:42	1
yhPJ SB									
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		01/23/17 10:23	01/25/17 16:42	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		20 4105	51-2/-16 15:2/	51-20-16 13:C2	1
1/ p CPFHA9	11/		20 4105	51-2/-16 15:2/	51-20-16 13:C2	1
1/ p CPFO9	11C		20 4105	51-2/-16 15:2/	51-20-16 13:C2	1
1/ p CPFOS	118		20 4105	51-2/-16 15:2/	51-20-16 13:C2	1
1/ p 0 PFN9	117		20 4105	51-2/-16 15:2/	51-20-16 13:C2	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		18O2 PFHx (25-150)	13C4-PFHp (25-150)	13C4 PFOA (25-150)	13C4 PFOA (25-150)	13C5 PFNA (25-150)
320-25170-1	168688	115	113	114	118	119
LCS 320-147397/2-A	Lab Control Sample	109	112	113	109	115
LCSD 320-147397/3-A	Lab Control Sample Dup	110	115	112	110	122
MB 320-147397/1-A	Method Blank	111	113	112	113	121

Surrogate Legend

18O2 PFHxS = 18O2 PFHxS
13C4-PFHpA = 13C4-PFHpA
13C4 PFOA = 13C4 PFOA
13C4 PFOS = 13C4 PFOS
13C5 PFNA = 13C5 PFNA

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-147397/1-A

Matrix: Water

Analysis Batch: 147638

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 147397

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		01/23/17 09:55	01/24/17 07:39	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		01/23/17 09:55	01/24/17 07:39	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		01/23/17 09:55	01/24/17 07:39	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		01/23/17 09:55	01/24/17 07:39	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		01/23/17 09:55	01/24/17 07:39	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		01/23/17 09:55	01/24/17 07:39	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	111		25 - 150	01/23/17 09:55	01/24/17 07:39	1
13C4-PFHxS	113		25 - 150	01/23/17 09:55	01/24/17 07:39	1
13C4 PFOA	112		25 - 150	01/23/17 09:55	01/24/17 07:39	1
13C4 PFOS	113		25 - 150	01/23/17 09:55	01/24/17 07:39	1
13C5 PFNA	121		25 - 150	01/23/17 09:55	01/24/17 07:39	1

Lab Sample ID: LCS 320-147397/2-A

Matrix: Water

Analysis Batch: 147638

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 147397

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	16.5		ng/L		93	55 - 147
Perfluorohexanesulfonic acid (PFHxS)	18.2	15.5		ng/L		85	58 - 138
Perfluoroheptanoic acid (PFHpA)	20.0	17.7		ng/L		89	63 - 135
Perfluorooctanoic acid (PFOA)	20.0	15.7		ng/L		79	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	14.7		ng/L		79	47 - 162
Perfluorononanoic acid (PFNA)	20.0	17.3		ng/L		87	71 - 140

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	109		25 - 150
13C4-PFHxS	112		25 - 150
13C4 PFOA	113		25 - 150
13C4 PFOS	109		25 - 150
13C5 PFNA	115		25 - 150

Lab Sample ID: LCSD 320-147397/3-A

Matrix: Water

Analysis Batch: 147638

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 147397

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	16.5		ng/L		93	55 - 147	0	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	15.8		ng/L		87	58 - 138	2	30
Perfluoroheptanoic acid (PFHpA)	20.0	18.2		ng/L		91	63 - 135	2	30
Perfluorooctanoic acid (PFOA)	20.0	17.0		ng/L		85	63 - 141	8	30
Perfluorooctanesulfonic acid (PFOS)	18.6	14.9		ng/L		80	47 - 162	1	30
Perfluorononanoic acid (PFNA)	20.0	16.8		ng/L		84	71 - 140	3	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc

Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1

SDG: 31-1-11735

<i>LCSD LCSD</i>		
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>
<i>Limits</i>		
18O2 PFHxS	110	25 - 150
13C4-PFHpA	115	25 - 150
13C4 PFOA	112	25 - 150
13C4 PFOS	110	25 - 150
13C5 PFNA	122	25 - 150

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QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

LCMS

Prep Batch: 147397

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25170-1	168688	Total/NA	Water	PFAS Prep	
MB 320-147397/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-147397/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-147397/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 147638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-147397/1-A	Method Blank	Total/NA	Water	PFAS	147397
LCS 320-147397/2-A	Lab Control Sample	Total/NA	Water	PFAS	147397
LCSD 320-147397/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	147397

Analysis Batch: 147790

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25170-1	168688	Total/NA	Water	PFAS	147397

Lab Chronicle

Client: Shannon & Wilson
 / Site: CitF okgait DanG gibe r bainin7 c bea

restcJ elina l oDA8 : 20- 01Pj - 6P
 S35 : 2P6Pj 21

Client Sample ID: 168688
Date Collected: 01/10/17 13:18
Date Received: 01/20/17 09:20

Lab Sample ID: 320-25170-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
rotalfNc	/ tep	/ gcS / tep			P.- - J 8	P.EE J 8	P4j 2Lj	- Pf02fPj P- :02	CCB	r c8 ScC
rotalfNc	cnalFsis	/ gcS		P			P4j j L-	- Pf01fPj PE:40	CBW	r c8 ScC

Laboratory References:

r c8 ScC Rr estcJ elina SantaJ entoT== , ivebside / abGvaFTWest SantaJ entoTCc L1E- 1Tr 98 (LPE)2j 20E -

restcJ elina SantaJ ento

Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-17
Arkansas DEQ	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-17
Connecticut	State Program	1	PH-0691	06-30-17
Florida	NELAP	4	E87570	06-30-17
Hawaii	State Program	9	N/A	01-31-17 *
Illinois	NELAP	5	200060	03-17-17
Kansas	NELAP	7	E-10375	10-31-17
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-17
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-17
New Jersey	NELAP	2	CA005	06-30-17
New York	NELAP	2	11666	04-01-17
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-17
Texas	NELAP	6	T104704399	07-31-17
US Fish & Wildlife	Federal		LE148388-0	10-31-17
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-17
Virginia	NELAP	3	460278	03-14-17
Washington	State Program	10	C581	05-05-17
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-29-17 *

* Certification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

LineSt: h&aSSoS WG iisoS7ISc

Project/site: I ity of FairbaSks Fire TraiSiSg Area

TestAmerica Job ID: 320-26100-1

hD5 : 31-1-11C36

Method	Method Description	Protocol	Laboratory
PFAh	Perfluorinated ArkynehubstaSces	TAL-hAI	TAL hAI

Protocol References:

TAL-hAI = TestAmerica Laboratories7G est hacrameSto7Facility htaSdard , OeratiSg Procedurep

Laboratory References:

TAL hAI = TestAmerica hacrameSto7. . 0 8 iRerside Parkv ay7G est hacrameSto7I A w69067TEL (w19)3C3-6900

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25170-1
SDG: 31-1-11735

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-25170-1	168688	Water	01/10/17 13:18	01/20/17 09:20

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2855 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory: TEST American
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

320-25170 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735</u>		Total Number of Containers	<u>2</u>	Signature: <u>M. Nadel</u> Time: <u>1:00</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>Reg Five Tr. Center</u>		COC Seals/Intact? Y/N/NA <u>—</u>		Printed Name: _____ Date: <u>1/19/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN</u>		Received Good Cond./Cold <u>—</u>		Company: <u>Marcy Nadel</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>FedEx</u>		Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Sampler: <u>RDD/APW/MDN</u>		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: <u>Standard</u>				Signature: <u>Corrie Edman</u> Time: <u>0920</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Special Instructions: <u>Please bill to 1735-007</u>				Printed Name: _____ Date: <u>1/20/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
				Company: <u>TAWS</u>		Company: _____		Company: _____	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

4.6°C

No. 34378

Login Sample Receipt Checklist

Client: Shannon & WilsonJmN

uomr 32 meQ - 610G751D
STR r 32 meQ - 7D775- G

Login Number: 25170

List Number: 1

Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
c avioaNiyitw' asnlk NheNkev o0is / -g maNk. 0b3nv as 2 eas30ev mwa s30yew 2 eteq	d0e	
dhe Nbole0s N3stovwsealJif p0esentJis intaN,	d0e	
Sa2 ple N3stovwsealsJif p0esentJa0e intaN,	r -A	
dhe Nbole0o0sa2 ples vo not appea0to haye m0en Nb2 p0b2 isev o0 ta2 pe0ev ' ith,	d0e	
Sa2 ples ' e0e 0eNeyev on iN,	d0e	
Coole0de2 pe0at30e is aNNeptam,	d0e	
Coole0de2 pe0at30e is 0eNb0rev,	d0e	
COC is p0esent,	d0e	
COC is fillev o3t in in< anv le. imle,	d0e	
COC is fillev o3t ' ith all pe0inent info02 ation,	d0e	
Is the l ielv Sa2 ple0s na2 e p0esent on COCF	d0e	
dhe0e a0e no visN0epanNes met' een the N0ntaine0s 0eNeyev anv the COC,	d0e	
Sa2 ples a0e 0eNeyev ' ithin ? olvin. di2 e H0(N3vin. tests ' ith i2 2 eviate ? dsx	d0e	
Sa2 ple N0ntaine0s haye le. imle lamels,	d0e	
Containe0s a0e not n0w<en o0lea<in. ,	d0e	
Sa2 ple N0lleNion vate-i2 es a0e p0yivev,	d0e	
App0p0date sa2 ple N0ntaine0s a0e 3sev,	d0e	
Sa2 ple n0ttles a0e Nb2 pletelwfillev,	d0e	
Sa2 ple) 0ese0yation Pe0fiev,	r -A	
dhe0e is s3ffiNent yol, fo0all 0eV3estev analwsesJinN, anw0eV3estev q S-q STs	d0e	
Containe0s 0eV3i0n. M0w heavspaNe haye no heavspaNe o0m8mle is / z2 2 H7-4"x	d0e	
q 3ltiphasiNsa2 ples a0e not p0esent,	d0e	
Sa2 ples vo not 0eV3i0e splittin. o0Nb2 positin. ,	d0e	
c esiv3al Chlo0ne CheNkev,	r -A	

Laboratory Data Review Checklist

Completed by:

Title: Date:

CS Report Name: Report Date:

Consultant Firm:

Laboratory Name: Laboratory Report Number:

ADEC File Number: ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 ☒ NA (Please explain.) Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Correct analyses requested?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The temperature blank or cooler was measured within the acceptable temperature range of 0°C to 6°C upon receipt at the laboratory, as specified in the EPA publication SW-846. This range has been approved by ADEC.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒Yes ☐No ☐NA (Please explain.)

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☐Yes ☐No ☒NA (Please explain.)

Comments:

There were no discrepancies identified by the laboratory.

- e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

4. Case Narrative

- a. Present and understandable?

☒Yes ☐No ☐NA (Please explain.)

Comments:

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

☐Yes ☒No ☐NA (Please explain.)

Comments:

The laboratory noted that there was insufficient sample volume to analyze a matrix spike (MS) and matrix spike duplicate (MSD) samples for preparation batch 320-147397.

- c. Were all corrective actions documented?

☐Yes ☐No ☒NA (Please explain.)

Comments:

The laboratory did not state that any corrective actions were required.

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

Comments:

The laboratory did not specify any effect on data quality or usability.

5. Samples Results

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Soil samples were not submitted with this work order.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The PQL, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable EPA lifetime drinking water health advisory levels and ADEC groundwater-cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Comments:

None; PFCs were not detected in MB 320-147397/1-A.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were 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 ☐ NA (Please explain.) Comments:

LCS/LCSD sample results were reported.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Metals and inorganics were not analyzed as part of this work order.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Percent recoveries were within the ranges required by the laboratory method.

- 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 ☐ NA (Please explain.) Comments:

The RPDs were within the laboratory limit of 30%. The maximum RPD was 8%.

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Percent recoveries for surrogates are within the laboratory limits of 25% to 150%.

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Qualification of the results was not required; see above.

- iv. Data quality or usability affected? (Use the comment box to explain.)
Comments:

The data quality and usability were not affected.

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 ☒ NA (Please explain.) Comments:

PFCs are not volatile compounds, therefore a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

A trip blank was not required; see above.

- iii. All results less than PQL?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

A trip blank was not required.

iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

ii. Submitted blind to lab?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO; however, field-duplicates samples are submitted at the appropriate frequency for the overall project.

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 ☒ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO.

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

Comments:

The data quality and usability were not affected; see above.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Reusable equipment was not utilized during sample collection for this WO; therefore an equipment blank is not required.

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

An equipment blank was not submitted with this WO.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

There were no other data qualifiers used.

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-25173-1

TestAmerica Sample Delivery Group: 31-1-11735

Client Project/Site: City of Fairbanks Fire Training Area

Revision: 1

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

2/3/2017 11:59:36 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

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results through

TotalAccess

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Visit us at:

www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Job ID: 320-25173-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-25173-1

Revision:

This report has been revised to report sample 320-25173-26 from sample re-extraction. It was noted by the client that the original result did not match historical results for the sample location. The sample was re-extracted from both sample bottles provided and re-extracted results were much less than initially reported for PFOS. As results from both container confirm each other on the re-extraction and the re-extraction was within holding time, only the re-extracted results are reported.

Receipt

The samples were received on 1/20/2017 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 4.3° C and 4.6° C.

LCMS

Method(s) PFAS: The samples were analyzed by the direct injection method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.1 "Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissue":

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-147564. A LCS and LCSD pair were extracted with the batch to demonstrate percission.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-147563. A LCS and LCSD pair were extracted with the batch to demonstrate percission.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 320-148844.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 167481

Lab Sample ID: 320-291R3-1

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	27	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	130	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 167913

Lab Sample ID: 320-291R3-2

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	28	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	190	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 167613

Lab Sample ID: 320-291R3-3

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	28	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	180	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 16R86R

Lab Sample ID: 320-291R3-4

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	37	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	56	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 7R318

Lab Sample ID: 320-291R3-9

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	4.3	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	24	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 1671R3

Lab Sample ID: 320-291R3-6

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	2.5	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	20	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 14R476

Lab Sample ID: 320-291R3-R

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	23	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	250	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 16R776

Lab Sample ID: 320-291R3-7

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	16	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	150	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 167432

Lab Sample ID: 320-291R3-8

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	22	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	180	2.0	1.3 ng/L	1	PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 1677R4

Lab Sample ID: 320-291R3-10

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	6.0	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	79	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 16R631

Lab Sample ID: 320-291R3-11

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	12	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	71	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 40R411

Lab Sample ID: 320-291R3-12

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	19	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	35	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 16RR94

Lab Sample ID: 320-291R3-13

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	11	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	51	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 167870

Lab Sample ID: 320-291R3-14

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	3.0	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	17	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 9269R6

Lab Sample ID: 320-291R3-19

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	3.6	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	36	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 7R339

Lab Sample ID: 320-291R3-16

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	3.9	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	11	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 7R407

Lab Sample ID: 320-291R3-1R

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	5.6	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	35	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 7R907

Lab Sample ID: 320-291R3-17

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	5.8	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	35	2.0	1.3 ng/L	1	PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 89630

Lab Sample ID: 320-291R3-18

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	5.4	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	23	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 167376

Lab Sample ID: 320-291R3-20

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	4.7	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	31	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 1673R7

Lab Sample ID: 320-291R3-21

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	4.8	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	21	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 167731

Lab Sample ID: 320-291R3-22

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	4.9	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	16	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 919 483-1

Lab Sample ID: 320-291R3-23

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	260	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	60	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 167473

Lab Sample ID: 320-291R3-24

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	31	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	250	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 919 483-2

Lab Sample ID: 320-291R3-29

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	13	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	32	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 16R701

Lab Sample ID: 320-291R3-26

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	4.9	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	16	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 6680RR

Lab Sample ID: 320-291R3-2R

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 5ype
Perfluorooctanoic acid (PFOA)	3.7	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	32	2.0	1.3 ng/L	1	PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 7R301

Lab Sample ID: 320-291R3-27

Sample	MeQ	Unit	ML	ADL	F nit	Dil	hac	D	AetdoP	Trep	5ype
Perfluorooctanoic acid (PFOA)	3.7		2.0	0.75	ng/L	1			PFAS	Total/NA	
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L	1			PFAS	Total/NA	

Client Sample ID: 1672R1

Lab Sample ID: 320-291R3-28

Sample	MeQ	Unit	ML	ADL	F nit	Dil	hac	D	AetdoP	Trep	5ype
Perfluorooctanoic acid (PFOA)	28		2.0	0.75	ng/L	1			PFAS	Total/NA	
Perfluorooctanesulfonic acid (PFOS)	260		2.0	1.3	ng/L	1			PFAS	Total/NA	

Client Sample ID: 1673R1

Lab Sample ID: 320-291R3-30

Sample	MeQ	Unit	ML	ADL	F nit	Dil	hac	D	AetdoP	Trep	5ype
Perfluorooctanoic acid (PFOA)	31		2.0	0.75	ng/L	1			PFAS	Total/NA	
Perfluorooctanesulfonic acid (PFOS)	250		2.0	1.3	ng/L	1			PFAS	Total/NA	

Client Sample ID: 82824

Lab Sample ID: 320-291R3-31

Sample	MeQ	Unit	ML	ADL	F nit	Dil	hac	D	AetdoP	Trep	5ype
Perfluorooctanoic acid (PFOA)	5.0		2.0	0.75	ng/L	1			PFAS	Total/NA	
Perfluorooctanesulfonic acid (PFOS)	34		2.0	1.3	ng/L	1			PFAS	Total/NA	

Client Sample ID: 16R873

Lab Sample ID: 320-291R3-32

Sample	MeQ	Unit	ML	ADL	F nit	Dil	hac	D	AetdoP	Trep	5ype
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L	1			PFAS	Total/NA	
Perfluorooctanesulfonic acid (PFOS)	29		2.0	1.3	ng/L	1			PFAS	Total/NA	

Client Sample ID: 167294

Lab Sample ID: 320-291R3-33

Sample	MeQ	Unit	ML	ADL	F nit	Dil	hac	D	AetdoP	Trep	5ype
Perfluorooctanoic acid (PFOA)	29		2.0	0.75	ng/L	1			PFAS	Total/NA	
Perfluorooctanesulfonic acid (PFOS)	55		2.0	1.3	ng/L	1			PFAS	Total/NA	

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168491

Date Collected: 01/11/17 11:15

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	27		2.0	0.75	ng/L		01/24/17 07:39	01/30/17 23:12	1
Perfluorooctanesulfonic acid (PFOS)	130		2.0	1.3	ng/L		01/24/17 07:39	01/30/17 23:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	119		25 - 150				01/24/17 07:39	01/30/17 23:12	1
13C4 PFOS	116		25 - 150				01/24/17 07:39	01/30/17 23:12	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168513

Date Collected: 01/11/17 09:54

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-2

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	28		2.0	0.75	ng/L		01/24/17 07:39	01/30/17 23:30	1
Perfluorooctanesulfonic acid (PFOS)	190		2.0	1.3	ng/L		01/24/17 07:39	01/30/17 23:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	117		25 - 150				01/24/17 07:39	01/30/17 23:30	1
13C4 PFOS	113		25 - 150				01/24/17 07:39	01/30/17 23:30	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168613

Date Collected: 01/11/17 09:44

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-3

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	28		2.0	0.75	ng/L		01/24/17 07:39	01/30/17 23:48	1
Perfluorooctanesulfonic acid (PFOS)	180		2.0	1.3	ng/L		01/24/17 07:39	01/30/17 23:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	122		25 - 150				01/24/17 07:39	01/30/17 23:48	1
13C4 PFOS	120		25 - 150				01/24/17 07:39	01/30/17 23:48	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 167967

Date Collected: 01/11/17 09:24

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-4

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	37		2.0	0.75	ng/L		01/24/17 07:39	01/31/17 00:07	1
Perfluorooctanesulfonic acid (PFOS)	56		2.0	1.3	ng/L		01/24/17 07:39	01/31/17 00:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	113		25 - 150				01/24/17 07:39	01/31/17 00:07	1
13C4 PFOS	113		25 - 150				01/24/17 07:39	01/31/17 00:07	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 87319

Date Collected: 01/11/17 14:20

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-5

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	4.3		2.0	0.75	ng/L		01/24/17 07:39	01/26/17 14:45	1
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L		01/24/17 07:39	01/26/17 14:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	116		25 - 150				01/24/17 07:39	01/26/17 14:45	1
13C4 PFOS	117		25 - 150				01/24/17 07:39	01/26/17 14:45	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168173

Date Collected: 01/11/17 16:39

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-6

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L		01/24/17 07:39	01/26/17 15:03	1
Perfluorooctanesulfonic acid (PFOS)	20		2.0	1.3	ng/L		01/24/17 07:39	01/26/17 15:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	118		25 - 150				01/24/17 07:39	01/26/17 15:03	1
13C4 PFOS	121		25 - 150				01/24/17 07:39	01/26/17 15:03	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 147486

Date Collected: 01/12/17 12:03

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-7

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	23		2.0	0.75	ng/L		01/24/17 07:39	01/31/17 00:25	1
Perfluorooctanesulfonic acid (PFOS)	250		2.0	1.3	ng/L		01/24/17 07:39	01/31/17 00:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	114		25 - 150				01/24/17 07:39	01/31/17 00:25	1
13C4 PFOS	114		25 - 150				01/24/17 07:39	01/31/17 00:25	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 167886

Date Collected: 01/12/17 13:07

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-8

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L		01/24/17 07:39	01/31/17 00:43	1
Perfluorooctanesulfonic acid (PFOS)	150		2.0	1.3	ng/L		01/24/17 07:39	01/31/17 00:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	110		25 - 150				01/24/17 07:39	01/31/17 00:43	1
13C4 PFOS	114		25 - 150				01/24/17 07:39	01/31/17 00:43	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168432

Date Collected: 01/12/17 18:05

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-9

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	22		2.0	0.75	ng/L		01/24/17 07:39	01/31/17 01:02	1
Perfluorooctanesulfonic acid (PFOS)	180		2.0	1.3	ng/L		01/24/17 07:39	01/31/17 01:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	114		25 - 150				01/24/17 07:39	01/31/17 01:02	1
13C4 PFOS	113		25 - 150				01/24/17 07:39	01/31/17 01:02	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168874

Date Collected: 01/13/17 12:35

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-10

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	6.0		2.0	0.75	ng/L		01/24/17 07:39	01/27/17 22:16	1
Perfluorooctanesulfonic acid (PFOS)	79		2.0	1.3	ng/L		01/24/17 07:39	01/27/17 22:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	114		25 - 150				01/24/17 07:39	01/27/17 22:16	1
13C4 PFOS	114		25 - 150				01/24/17 07:39	01/27/17 22:16	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 167631

Date Collected: 01/13/17 14:08

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-11

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	12		2.0	0.75	ng/L		01/24/17 07:39	01/31/17 01:20	1
Perfluorooctanesulfonic acid (PFOS)	71		2.0	1.3	ng/L		01/24/17 07:39	01/31/17 01:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	130		25 - 150				01/24/17 07:39	01/31/17 01:20	1
13C4 PFOS	120		25 - 150				01/24/17 07:39	01/31/17 01:20	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 407411

Date Collected: 01/16/17 11:26

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-12

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	19		2.0	0.75	ng/L		01/24/17 07:39	01/31/17 01:38	1
Perfluorooctanesulfonic acid (PFOS)	35		2.0	1.3	ng/L		01/24/17 07:39	01/31/17 01:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	117		25 - 150				01/24/17 07:39	01/31/17 01:38	1
13C4 PFOS	115		25 - 150				01/24/17 07:39	01/31/17 01:38	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 167754

Date Collected: 01/16/17 12:35

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-13

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	11		2.0	0.75	ng/L		01/24/17 07:39	01/31/17 02:15	1
Perfluorooctanesulfonic acid (PFOS)	51		2.0	1.3	ng/L		01/24/17 07:39	01/31/17 02:15	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	117		25 - 150				01/24/17 07:39	01/31/17 02:15	1
13C4 PFOS	116		25 - 150				01/24/17 07:39	01/31/17 02:15	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168980

Date Collected: 01/16/17 14:48

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-14

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L		01/24/17 07:39	01/27/17 22:34	1
Perfluorooctanesulfonic acid (PFOS)	17		2.0	1.3	ng/L		01/24/17 07:39	01/27/17 22:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	123		25 - 150				01/24/17 07:39	01/27/17 22:34	1
13C4 PFOS	127		25 - 150				01/24/17 07:39	01/27/17 22:34	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 526576

Date Collected: 01/16/17 16:49

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-15

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.6		2.0	0.75	ng/L		01/24/17 07:39	01/26/17 15:21	1
Perfluorooctanesulfonic acid (PFOS)	36		2.0	1.3	ng/L		01/24/17 07:39	01/26/17 15:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	117		25 - 150				01/24/17 07:39	01/26/17 15:21	1
13C4 PFOS	119		25 - 150				01/24/17 07:39	01/26/17 15:21	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 87335

Date Collected: 01/16/17 12:27

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-16

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.75	ng/L		01/24/17 07:39	01/27/17 22:52	1
Perfluorooctanesulfonic acid (PFOS)	11		2.0	1.3	ng/L		01/24/17 07:39	01/27/17 22:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	115		25 - 150				01/24/17 07:39	01/27/17 22:52	1
13C4 PFOS	117		25 - 150				01/24/17 07:39	01/27/17 22:52	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 87408

Date Collected: 01/16/17 14:40

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-17

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	5.6		2.0	0.75	ng/L		01/24/17 07:39	01/27/17 23:11	1
Perfluorooctanesulfonic acid (PFOS)	35		2.0	1.3	ng/L		01/24/17 07:39	01/27/17 23:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	112		25 - 150				01/24/17 07:39	01/27/17 23:11	1
13C4 PFOS	113		25 - 150				01/24/17 07:39	01/27/17 23:11	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 87508

Date Collected: 01/16/17 14:30

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-18

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	5.8		2.0	0.75	ng/L		01/24/17 07:43	01/27/17 23:29	1
Perfluorooctanesulfonic acid (PFOS)	35		2.0	1.3	ng/L		01/24/17 07:43	01/27/17 23:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	116		25 - 150				01/24/17 07:43	01/27/17 23:29	1
13C4 PFOS	117		25 - 150				01/24/17 07:43	01/27/17 23:29	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 95630

Date Collected: 01/16/17 15:50

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-19

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	5.4		2.0	0.75	ng/L		01/24/17 07:43	01/31/17 02:33	1
Perfluorooctanesulfonic acid (PFOS)	23		2.0	1.3	ng/L		01/24/17 07:43	01/31/17 02:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	123		25 - 150				01/24/17 07:43	01/31/17 02:33	1
13C4 PFOS	121		25 - 150				01/24/17 07:43	01/31/17 02:33	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168386

Date Collected: 01/17/17 12:20

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-20

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	4.7		2.0	0.75	ng/L		01/24/17 07:43	01/27/17 23:48	1
Perfluorooctanesulfonic acid (PFOS)	31		2.0	1.3	ng/L		01/24/17 07:43	01/27/17 23:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	116		25 - 150				01/24/17 07:43	01/27/17 23:48	1
13C4 PFOS	119		25 - 150				01/24/17 07:43	01/27/17 23:48	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168378

Date Collected: 01/17/17 13:17

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-21

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	4.8		2.0	0.75	ng/L		01/24/17 07:43	01/28/17 00:06	1
Perfluorooctanesulfonic acid (PFOS)	21		2.0	1.3	ng/L		01/24/17 07:43	01/28/17 00:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	123		25 - 150				01/24/17 07:43	01/28/17 00:06	1
13C4 PFOS	127		25 - 150				01/24/17 07:43	01/28/17 00:06	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168831

Date Collected: 01/17/17 13:22

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-22

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	4.9		2.0	0.75	ng/L		01/24/17 07:43	01/28/17 00:24	1
Perfluorooctanesulfonic acid (PFOS)	16		2.0	1.3	ng/L		01/24/17 07:43	01/28/17 00:24	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	124		25 - 150				01/24/17 07:43	01/28/17 00:24	1
13C4 PFOS	129		25 - 150				01/24/17 07:43	01/28/17 00:24	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 515 493-1

Date Collected: 01/17/17 14:39

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-23

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	260		2.0	0.75	ng/L		01/24/17 07:43	01/31/17 02:52	1
Perfluorooctanesulfonic acid (PFOS)	60		2.0	1.3	ng/L		01/24/17 07:43	01/31/17 02:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	113		25 - 150				01/24/17 07:43	01/31/17 02:52	1
13C4 PFOS	114		25 - 150				01/24/17 07:43	01/31/17 02:52	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168483

Date Collected: 01/17/17 14:55

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-24

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	31		2.0	0.75	ng/L		01/24/17 07:43	01/31/17 03:10	1
Perfluorooctanesulfonic acid (PFOS)	250		2.0	1.3	ng/L		01/24/17 07:43	01/31/17 03:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	117		25 - 150				01/24/17 07:43	01/31/17 03:10	1
13C4 PFOS	116		25 - 150				01/24/17 07:43	01/31/17 03:10	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 515 493-2

Date Collected: 01/17/17 15:22

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-25

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	13		2.0	0.75	ng/L		01/24/17 07:43	01/31/17 03:28	1
Perfluorooctanesulfonic acid (PFOS)	32		2.0	1.3	ng/L		01/24/17 07:43	01/31/17 03:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	121		25 - 150				01/24/17 07:43	01/31/17 03:28	1
13C4 PFOS	118		25 - 150				01/24/17 07:43	01/31/17 03:28	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 167801

Date Collected: 01/18/17 16:44

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-26

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	4.9		2.0	0.75	ng/L		02/02/17 13:30	02/03/17 02:56	1
Perfluorooctanesulfonic acid (PFOS)	16		2.0	1.3	ng/L		02/02/17 13:30	02/03/17 02:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	130		25 - 150				02/02/17 13:30	02/03/17 02:56	1
13C4 PFOS	120		25 - 150				02/02/17 13:30	02/03/17 02:56	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 669077

Date Collected: 01/18/17 09:42

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-27

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.7		2.0	0.75	ng/L		01/24/17 07:43	01/28/17 01:01	1
Perfluorooctanesulfonic acid (PFOS)	32		2.0	1.3	ng/L		01/24/17 07:43	01/28/17 01:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	113		25 - 150				01/24/17 07:43	01/28/17 01:01	1
13C4 PFOS	113		25 - 150				01/24/17 07:43	01/28/17 01:01	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 87301

Date Collected: 01/18/17 10:32

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-28

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.7		2.0	0.75	ng/L		01/24/17 07:43	01/28/17 01:38	1
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L		01/24/17 07:43	01/28/17 01:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	122		25 - 150				01/24/17 07:43	01/28/17 01:38	1
13C4 PFOS	122		25 - 150				01/24/17 07:43	01/28/17 01:38	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168271

Date Collected: 01/18/17 12:20

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-29

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	28		2.0	0.75	ng/L		01/24/17 07:43	01/31/17 03:47	1
Perfluorooctanesulfonic acid (PFOS)	260		2.0	1.3	ng/L		01/24/17 07:43	01/31/17 03:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	122		25 - 150				01/24/17 07:43	01/31/17 03:47	1
13C4 PFOS	122		25 - 150				01/24/17 07:43	01/31/17 03:47	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168371

Date Collected: 01/18/17 12:10

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-30

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	31		2.0	0.75	ng/L		01/24/17 07:43	01/31/17 04:05	1
Perfluorooctanesulfonic acid (PFOS)	250		2.0	1.3	ng/L		01/24/17 07:43	01/31/17 04:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	109		25 - 150				01/24/17 07:43	01/31/17 04:05	1
13C4 PFOS	111		25 - 150				01/24/17 07:43	01/31/17 04:05	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 92924

Date Collected: 01/18/17 13:50

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-31

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	5.0		2.0	0.75	ng/L		01/24/17 07:43	01/28/17 01:56	1
Perfluorooctanesulfonic acid (PFOS)	34		2.0	1.3	ng/L		01/24/17 07:43	01/28/17 01:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	110		25 - 150				01/24/17 07:43	01/28/17 01:56	1
13C4 PFOS	117		25 - 150				01/24/17 07:43	01/28/17 01:56	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 167983

Date Collected: 01/18/17 14:40

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-32

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	16		2.0	0.75	ng/L		01/24/17 07:43	01/31/17 04:23	1
Perfluorooctanesulfonic acid (PFOS)	29		2.0	1.3	ng/L		01/24/17 07:43	01/31/17 04:23	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	122		25 - 150				01/24/17 07:43	01/31/17 04:23	1
13C4 PFOS	123		25 - 150				01/24/17 07:43	01/31/17 04:23	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Client Sample ID: 168254

Date Collected: 01/18/17 16:10

Date Received: 01/20/17 09:20

Lab Sample ID: 320-25173-33

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	29		2.0	0.75	ng/L		01/24/17 07:43	01/31/17 04:42	1
Perfluorooctanesulfonic acid (PFOS)	55		2.0	1.3	ng/L		01/24/17 07:43	01/31/17 04:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	122		25 - 150				01/24/17 07:43	01/31/17 04:42	1
13C4 PFOS	119		25 - 150				01/24/17 07:43	01/31/17 04:42	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	3C4 PFO/ (25-150)	3C4 PFO/ (25-150)
320-25173-1	168491	119	116
320-25173-2	168513	117	113
320-25173-3	168613	122	120
320-25173-4	167967	113	113
320-25173-5	87319	116	117
320-25173-6	168173	118	121
320-25173-7	147486	114	114
320-25173-8	167886	110	114
320-25173-9	168432	114	113
320-25173-10	168874	114	114
320-25173-11	167631	130	120
320-25173-12	407411	117	115
320-25173-13	167754	117	116
320-25173-14	168980	123	127
320-25173-15	526576	117	119
320-25173-16	87335	115	117
320-25173-17	87408	112	113
320-25173-18	87508	116	117
320-25173-19	95630	123	121
320-25173-20	168386	116	119
320-25173-21	168378	123	127
320-25173-22	168831	124	129
320-25173-23	515 493-1	113	114
320-25173-24	168483	117	116
320-25173-25	515 493-2	121	118
320-25173-26	167801	130	120
320-25173-27	669077	113	113
320-25173-28	87301	122	122
320-25173-29	168271	122	122
320-25173-30	168371	109	111
320-25173-31	92924	110	117
320-25173-32	167983	122	123
320-25173-33	168254	122	119
LCS 320-147563/2-A	Lab Control Sample	122	118
LCS 320-147564/2-A	Lab Control Sample	126	122
LCS 320-148844/2-A	Lab Control Sample	121	117
LCSD 320-147563/3-A	Lab Control Sample Dup	120	119
LCSD 320-147564/3-A	Lab Control Sample Dup	125	119
LCSD 320-148844/3-A	Lab Control Sample Dup	130	126
MB 320-147563/1-A	Method Blank	131	125
MB 320-147564/1-A	Method Blank	123	120
MB 320-148844/1-A	Method Blank	122	120

Surrogate Legend

13C4 PFOA = 13C4 PFOA

13C4 PFOS = 13C4 PFOS

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-147563/1-A

Matrix: Water

Analysis Batch: 147767

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 147563

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		01/24/17 07:39	01/24/17 18:04	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		01/24/17 07:39	01/24/17 18:04	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	131		25 - 150				01/24/17 07:39	01/24/17 18:04	1
13C4 PFOS	125		25 - 150				01/24/17 07:39	01/24/17 18:04	1

Lab Sample ID: LCS 320-147563/2-A

Matrix: Water

Analysis Batch: 147767

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 147563

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	%Rec.
Perfluorooctanoic acid (PFOA)	20.0	16.1		ng/L		81	63 - 141	
Perfluorooctanesulfonic acid (PFOS)	18.6	14.8		ng/L		80	47 - 162	
Isotope Dilution	%Recovery	LCS Qualifier	Limits					
13C4 PFOA	122		25 - 150					
13C4 PFOS	118		25 - 150					

Lab Sample ID: LCSD 320-147563/3-A

Matrix: Water

Analysis Batch: 147767

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 147563

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	16.2		ng/L		81	63 - 141	0	30
Perfluorooctanesulfonic acid (PFOS)	18.6	14.2		ng/L		77	47 - 162	4	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	120		25 - 150						
13C4 PFOS	119		25 - 150						

Lab Sample ID: MB 320-147564/1-A

Matrix: Water

Analysis Batch: 147770

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 147564

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		01/24/17 07:43	01/25/17 02:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		01/24/17 07:43	01/25/17 02:01	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	123		25 - 150				01/24/17 07:43	01/25/17 02:01	1
13C4 PFOS	120		25 - 150				01/24/17 07:43	01/25/17 02:01	1

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-147564/2-A

Matrix: Water

Analysis Batch: 147770

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 147564

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	17.1		ng/L		85	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	15.0		ng/L		81	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	126		25 - 150				
13C4 PFOS	122		25 - 150				

Lab Sample ID: LCSD 320-147564/3-A

Matrix: Water

Analysis Batch: 147770

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 147564

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	16.2		ng/L		81	63 - 141	5	30
Perfluorooctanesulfonic acid (PFOS)	18.6	15.1		ng/L		82	47 - 162	1	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	125		25 - 150						
13C4 PFOS	119		25 - 150						

Lab Sample ID: MB 320-148844/1-A

Matrix: Water

Analysis Batch: 148829

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 148844

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		02/02/17 13:30	02/03/17 02:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		02/02/17 13:30	02/03/17 02:01	1
Isotope Dilution	%Recovery	MB Qualifier	Limits						
13C4 PFOA	122		25 - 150						
13C4 PFOS	120		25 - 150						

Lab Sample ID: LCS 320-148844/2-A

Matrix: Water

Analysis Batch: 148829

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 148844

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	14.6		ng/L		73	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	13.0		ng/L		70	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	121		25 - 150				
13C4 PFOS	117		25 - 150				

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-148844/3-A

Matrix: Water

Analysis Batch: 148829

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 148844

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	20.0	15.5		ng/L		78	63 - 141	6	30
Perfluorooctanesulfonic acid (PFOS)	18.6	13.0		ng/L		70	47 - 162	0	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C4 PFOA	130		25 - 150
13C4 PFOS	126		25 - 150

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

LCMS

Prep Batch: 147563

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25173-1	168491	Total/NA	Water	PFAS Prep	
320-25173-2	168513	Total/NA	Water	PFAS Prep	
320-25173-3	168613	Total/NA	Water	PFAS Prep	
320-25173-4	167967	Total/NA	Water	PFAS Prep	
320-25173-5	87319	Total/NA	Water	PFAS Prep	
320-25173-6	168173	Total/NA	Water	PFAS Prep	
320-25173-7	147486	Total/NA	Water	PFAS Prep	
320-25173-8	167886	Total/NA	Water	PFAS Prep	
320-25173-9	168432	Total/NA	Water	PFAS Prep	
320-25173-10	168874	Total/NA	Water	PFAS Prep	
320-25173-11	167631	Total/NA	Water	PFAS Prep	
320-25173-12	407411	Total/NA	Water	PFAS Prep	
320-25173-13	167754	Total/NA	Water	PFAS Prep	
320-25173-14	168980	Total/NA	Water	PFAS Prep	
320-25173-15	526576	Total/NA	Water	PFAS Prep	
320-25173-16	87335	Total/NA	Water	PFAS Prep	
320-25173-17	87408	Total/NA	Water	PFAS Prep	
MB 320-147563/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-147563/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-147563/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 147564

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25173-18	87508	Total/NA	Water	PFAS Prep	
320-25173-19	95630	Total/NA	Water	PFAS Prep	
320-25173-20	168386	Total/NA	Water	PFAS Prep	
320-25173-21	168378	Total/NA	Water	PFAS Prep	
320-25173-22	168831	Total/NA	Water	PFAS Prep	
320-25173-23	515 493-1	Total/NA	Water	PFAS Prep	
320-25173-24	168483	Total/NA	Water	PFAS Prep	
320-25173-25	515 493-2	Total/NA	Water	PFAS Prep	
320-25173-27	669077	Total/NA	Water	PFAS Prep	
320-25173-28	87301	Total/NA	Water	PFAS Prep	
320-25173-29	168271	Total/NA	Water	PFAS Prep	
320-25173-30	168371	Total/NA	Water	PFAS Prep	
320-25173-31	92924	Total/NA	Water	PFAS Prep	
320-25173-32	167983	Total/NA	Water	PFAS Prep	
320-25173-33	168254	Total/NA	Water	PFAS Prep	
MB 320-147564/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-147564/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-147564/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 147767

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-147563/1-A	Method Blank	Total/NA	Water	PFAS	147563
LCS 320-147563/2-A	Lab Control Sample	Total/NA	Water	PFAS	147563
LCSD 320-147563/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	147563

Analysis Batch: 147770

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-147564/1-A	Method Blank	Total/NA	Water	PFAS	147564

TestAmerica Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

LCMS (Continued)

Analysis Batch: 147770 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-147564/2-A	Lab Control Sample	Total/NA	Water	PFAS	147564
LCSD 320-147564/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	147564

Analysis Batch: 147990

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25173-5	87319	Total/NA	Water	PFAS	147563
320-25173-6	168173	Total/NA	Water	PFAS	147563
320-25173-15	526576	Total/NA	Water	PFAS	147563

Analysis Batch: 148265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25173-10	168874	Total/NA	Water	PFAS	147563
320-25173-14	168980	Total/NA	Water	PFAS	147563
320-25173-16	87335	Total/NA	Water	PFAS	147563
320-25173-17	87408	Total/NA	Water	PFAS	147563
320-25173-18	87508	Total/NA	Water	PFAS	147564
320-25173-20	168386	Total/NA	Water	PFAS	147564
320-25173-21	168378	Total/NA	Water	PFAS	147564
320-25173-22	168831	Total/NA	Water	PFAS	147564
320-25173-27	669077	Total/NA	Water	PFAS	147564
320-25173-28	87301	Total/NA	Water	PFAS	147564
320-25173-31	92924	Total/NA	Water	PFAS	147564

Analysis Batch: 148445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25173-1	168491	Total/NA	Water	PFAS	147563
320-25173-2	168513	Total/NA	Water	PFAS	147563
320-25173-3	168613	Total/NA	Water	PFAS	147563
320-25173-4	167967	Total/NA	Water	PFAS	147563
320-25173-7	147486	Total/NA	Water	PFAS	147563
320-25173-8	167886	Total/NA	Water	PFAS	147563
320-25173-9	168432	Total/NA	Water	PFAS	147563
320-25173-11	167631	Total/NA	Water	PFAS	147563
320-25173-12	407411	Total/NA	Water	PFAS	147563
320-25173-13	167754	Total/NA	Water	PFAS	147563
320-25173-19	95630	Total/NA	Water	PFAS	147564
320-25173-23	515 493-1	Total/NA	Water	PFAS	147564
320-25173-24	168483	Total/NA	Water	PFAS	147564
320-25173-25	515 493-2	Total/NA	Water	PFAS	147564
320-25173-29	168271	Total/NA	Water	PFAS	147564
320-25173-30	168371	Total/NA	Water	PFAS	147564
320-25173-32	167983	Total/NA	Water	PFAS	147564
320-25173-33	168254	Total/NA	Water	PFAS	147564

Analysis Batch: 148829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25173-26	167801	Total/NA	Water	PFAS	148844
MB 320-148844/1-A	Method Blank	Total/NA	Water	PFAS	148844
LCS 320-148844/2-A	Lab Control Sample	Total/NA	Water	PFAS	148844
LCSD 320-148844/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	148844

TestAmerica Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

LCMS (Continued)

Prep Batch: 148844

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25173-26	167801	Total/NA	Water	PFAS Prep	
MB 320-148844/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-148844/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-148844/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Lab Chronicle

Client: Shannon & Wilson
 / byentfSite: CitF okgailDanG gibe r bainin7 c bea

restcJ ebina loDAS : 20- 01Pj 2P
 S35 : 2P6PPj 21

Client Sample ID: 168491

Date Collecte5: 01R1R x 11:1M

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mlx3-1

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
r otalf. c	/ tep	/ gcS / tep			PE - J L	PE - J L	P8j 1N2	- Pf08fPj - j :24	CCB	r cL ScC
r otalf. c	cnalFsis	/ gcS		P			P8R881	- Pf2- fPj 02:P0	S=,	r cL ScC

Client Sample ID: 168M13

Date Collecte5: 01R1R x 09:1M

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mlx3-2

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
r otalf. c	/ tep	/ gcS / tep			PE - J L	PE - J L	P8j 1N2	- Pf08fPj - j :24	CCB	r cL ScC
r otalf. c	cnalFsis	/ gcS		P			P8R881	- Pf2- fPj 02:2-	S=,	r cL ScC

Client Sample ID: 168613

Date Collecte5: 01R1R x 09:44

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mlx3-3

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
r otalf. c	/ tep	/ gcS / tep			PE - J L	PE - J L	P8j 1N2	- Pf08fPj - j :24	CCB	r cL ScC
r otalf. c	cnalFsis	/ gcS		P			P8R881	- Pf2- fPj 02:8R	S=,	r cL ScC

Client Sample ID: 16x96x

Date Collecte5: 01R1R x 09:24

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mlx3-4

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
r otalf. c	/ tep	/ gcS / tep			PE - J L	PE - J L	P8j 1N2	- Pf08fPj - j :24	CCB	r cL ScC
r otalf. c	cnalFsis	/ gcS		P			P8R881	- Pf2PPj -- :j	S=,	r cL ScC

Client Sample ID: 8x319

Date Collecte5: 01R1R x 14:20

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mlx3-N

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
r otalf. c	/ tep	/ gcS / tep			PE - J L	PE - J L	P8j 1N2	- Pf08fPj - j :24	CCB	r cL ScC
r otalf. c	cnalFsis	/ gcS		P			P8j 44-	- Pf0NPj P8:81	S=,	r cL ScC

Client Sample ID: 1681x3

Date Collecte5: 01R1R x 16:39

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mlx3-6

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
r otalf. c	/ tep	/ gcS / tep			PE - J L	PE - J L	P8j 1N2	- Pf08fPj - j :24	CCB	r cL ScC
r otalf. c	cnalFsis	/ gcS		P			P8j 44-	- Pf0NPj P1:-2	S=,	r cL ScC

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Lab Chronicle

Client: Shannon & Wilson
 / Site: CitFokgailDanG gite r bainin7 cbea

restcJ ebina l oDAS : 20- 01Pj 2P
 S35 : 2P6PPj 21

Client Sample ID: 14x486

Date Collecte5: 01R2R x 12:03

Date v ecei7e5: 01R2R x 09:20

Lab Sample ID: 320-2Mlx3-x

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - - :01	S=,	r cL ScC

Client Sample ID: 16x886

Date Collecte5: 01R2R x 13:0x

Date v ecei7e5: 01R2R x 09:20

Lab Sample ID: 320-2Mlx3-8

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - - :82	S=,	r cL ScC

Client Sample ID: 168432

Date Collecte5: 01R2R x 18:0M

Date v ecei7e5: 01R2R x 09:20

Lab Sample ID: 320-2Mlx3-9

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - P: 0	S=,	r cL ScC

Client Sample ID: 1688x4

Date Collecte5: 01R3R x 12:3M

Date v ecei7e5: 01R2R x 09:20

Lab Sample ID: 320-2Mlx3-10

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R0N1	- P0j fPj 00:PN	S=,	r cL ScC

Client Sample ID: 16x631

Date Collecte5: 01R3R x 14:08

Date v ecei7e5: 01R2R x 09:20

Lab Sample ID: 320-2Mlx3-11

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - P:0-	S=,	r cL ScC

Client Sample ID: 40x411

Date Collecte5: 01R6R x 11:26

Date v ecei7e5: 01R2R x 09:20

Lab Sample ID: 320-2Mlx3-12

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - P:2R	S=,	r cL ScC

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Lab Chronicle

Client: Shannon & Wilson
 / byentfSite: CitF okgailDanG gite r bainin7 c bea

restcJ ebina l oDAB : 20- 001Pj 2P
 S3 5 : 2P0P0Pj 21

Client Sample ID: 16xxM4

Date Collecte5: 01R6R x 12:3M

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-13

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ tep	/ gcS / tep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P02P0Pj - 0:P1	S=,	r cL ScC

Client Sample ID: 168980

Date Collecte5: 01R6R x 14:48

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-14

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ tep	/ gcS / tep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R0N1	- P0j fPj 00:28	S=,	r cL ScC

Client Sample ID: M26M6

Date Collecte5: 01R6R x 16:49

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-1M

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ tep	/ gcS / tep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8j 44-	- P0NfPj P1:0P	S=,	r cL ScC

Client Sample ID: 8x33M

Date Collecte5: 01R6R x 12:2x

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-16

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ tep	/ gcS / tep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R0N1	- P0j fPj 00:10	S=,	r cL ScC

Client Sample ID: 8x408

Date Collecte5: 01R6R x 14:40

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-1x

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ tep	/ gcS / tep			PE - J L	PENJ L	P8j 1N2	- P08fPj - j :24	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R0N1	- P0j fPj 02:PP	S=,	r cL ScC

Client Sample ID: 8xM08

Date Collecte5: 01R6R x 14:30

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-18

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ tep	/ gcS / tep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R0N1	- P0j fPj 02:04	S=,	r cL ScC

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Lab Chronicle

Client: Shannon & Wilson
 Site: CitF okgail DanG gite r bainin7 c bea

restcJ ebina l oDAS : 20- 01Pj 2P
 S3 5 : 2P6PPj 21

Client Sample ID: 9M630

Date Collecte5: 01R6R x 1MM

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-19

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - 0:22	S=,	r cL ScC

Client Sample ID: 168386

Date Collecte5: 01R xR x 12:20

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-20

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8RON1	- P0j fPj 02:8R	S=,	r cL ScC

Client Sample ID: 1683x8

Date Collecte5: 01R xR x 13:1x

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-21

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8RON1	- P0RPj -- : N	S=,	r cL ScC

Client Sample ID: 168831

Date Collecte5: 01R xR x 13:22

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-22

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8RON1	- P0RPj -- :08	S=,	r cL ScC

Client Sample ID: MIM493-1

Date Collecte5: 01R xR x 14:39

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-23

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - 0:10	S=,	r cL ScC

Client Sample ID: 168483

Date Collecte5: 01R xR x 14:MM

Date v ecei7e5: 01R0R x 09:20

Lab Sample ID: 320-2Mx3-24

Watrid: / ater

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - 2:P-	S=,	r cL ScC

restcJ ebina SantaJ ento

Lab Chronicle

Client: Shannon & Wilson
/ byentfSite: CitF okgailDanG gite r bainin7 c bea

restcJ ebina l oDAB : 20- 01Pj 2P
S3 5 : 2P6PPj 21

Client Sample ID: MIM493-2

Lab Sample ID: 320-2Mlx3-2M

Date Collecte5: 01R xR x 1M22

Watrid: / ater

Date v ecei7e5: 01R0R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08Pj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - 2:0R	S=,	r cL ScC

Client Sample ID: 16x801

Lab Sample ID: 320-2Mlx3-26

Date Collecte5: 01R8R x 16:44

Watrid: / ater

Date v ecei7e5: 01R0R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			P J L	PENJ L	P8R88	- 0f- 0Pj P2:2-	CBW	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R04	- 0f- 2Pj - 0:1N	CBW	r cL ScC

Client Sample ID: 6690xx

Lab Sample ID: 320-2Mlx3-2x

Date Collecte5: 01R8R x 09:42

Watrid: / ater

Date v ecei7e5: 01R0R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08Pj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R0N1	- P0RPj - P:- P	S=,	r cL ScC

Client Sample ID: 8x301

Lab Sample ID: 320-2Mlx3-28

Date Collecte5: 01R8R x 10:32

Watrid: / ater

Date v ecei7e5: 01R0R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08Pj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R0N1	- P0RPj - P:2R	S=,	r cL ScC

Client Sample ID: 1682x1

Lab Sample ID: 320-2Mlx3-29

Date Collecte5: 01R8R x 12:20

Watrid: / ater

Date v ecei7e5: 01R0R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08Pj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - 2:8j	S=,	r cL ScC

Client Sample ID: 1683x1

Lab Sample ID: 320-2Mlx3-30

Date Collecte5: 01R8R x 12:10

Watrid: / ater

Date v ecei7e5: 01R0R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08Pj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PPj - 8:- 1	S=,	r cL ScC

restcJ ebina SantaJ ento

Lab Chronicle

Client: Shannon & Wilson
 / Site: CitF okgail DanG gite r bainin7 c bea

restcJ elina l oDA : 20- 01Pj 2P
 S3 5 : 2P6PPj 21

Client Sample ID: 92924

Lab Sample ID: 320-2Mx3-31

Date Collecte5: 01R8R x 13:10

Watrid: / ater

Date v ecei7e5: 01R20R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R0N1	- P0RfPj - P:1N	S=,	r cL ScC

Client Sample ID: 16x983

Lab Sample ID: 320-2Mx3-32

Date Collecte5: 01R8R x 14:40

Watrid: / ater

Date v ecei7e5: 01R20R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PfPj - 8:02	S=,	r cL ScC

Client Sample ID: 1682M4

Lab Sample ID: 320-2Mx3-33

Date Collecte5: 01R8R x 16:10

Watrid: / ater

Date v ecei7e5: 01R20R x 09:20

Prep Type	Batch Type	Batch Wetho5	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare5 or Analyze5	Analyst	Lab
rotalf. c	/ bep	/ gcS / bep			PE - J L	PENJ L	P8j 1N8	- P08fPj - j :82	CCB	r cL ScC
rotalf. c	cnalFsis	/ gcS		P			P8R881	- P2PfPj - 8:80	S=,	r cL ScC

Laboratory v eferences:

r cL ScC v restcJ elina SantaJ entoTRR , idebsive / atC9 aFTWest SantaJ entoTCc 41N- 1Tr =L (4PN)2j 20IN -

restcJ elina SantaJ ento

Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska I9 ST8	State Program	10	9 ST-055	12-1E-17
Ari(ona	State Program	U	A) 070E	0E-11-17
Arkansas Dz Z	State Program	Q	EE-0QU1	0Q-17-17
California	State Program	U	2EU7	01-31-1E
Colorado	State Program	E	CA00066	0E-31-17
Connectic4t	State Program	1	Pu -0QU1	0Q-30-17
Florida	Nz HAP	6	z E7570	0Q-30-17
u awaii	State Program	U	N/A	01-31-17 *
Illinois	Nz HAP	5	2000QD	03-17-17
Kansas	Nz HAP	7	z -10375	10-31-17
H-A-B	DoD z HAP		H26QE	01-20-1E
Hb4isiana	Nz HAP	Q	30Q12	0Q-30-17
Maine	State Program	1	CA0006	06-1E-1E
Michigan	State Program	5	UU67	01-31-1E
Nevada	State Program	U	CA00066	07-31-17
New Jersey	Nz HAP	2	CA005	0Q-30-17
New York	Nz HAP	2	11QQQ	06-01-17
Oregon	Nz HAP	10	6060	01-2E-1E
Pennsylvania	Nz HAP	3	QE-01272	03-31-17
Texas	Nz HAP	Q	T1067063UU	07-31-17
9 S Fish & Wildlife	Federal		H2 16E3EE-0	10-31-17
9 SDA	Federal		P330-11-0063Q	12-30-17
9 Sz PA 9 CMR	Federal	1	CA00066	11-0Q-1E
9 tah	Nz HAP	E	CA00066	02-2E-17
Virginia	Nz HAP	3	6QD27E	03-16-17
Washington	State Program	10	C5E1	05-05-17
West Virginia LDW8	State Program	3	UU80C	12-31-17
Wyoming	State Program	E	ETMS-H	01-2U-17 *

* Certification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

LineSt: h&aSSoS WG iisoS7ISc

Project/hite: I ity of FairbaSks Fire TraiSiSg Area

TestAmerica Job ID: 320-261C3-1

hD5 : 31-1-11C36

Method	Method Description	Protocol	Laboratory
PFAh	Perfluorinated ArkynehubstaSces	TAL-hAI	TAL hAI

Protocol References:

TAL-hAI = TestAmerica Laboratories7G est hacrameSto7Facility htaSdard , OeratiSg Procedurep

Laboratory References:

TAL hAI = TestAmerica hacrameSto7. . 0 8 iRerside Parkv ay7G est hacrameSto7I A w69067TEL (w19)3C3-6900

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25173-1
SDG: 31-1-11735

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-25173-1	168491	Water	01/11/17 11:15	01/20/17 09:20
320-25173-2	168513	Water	01/11/17 09:54	01/20/17 09:20
320-25173-3	168613	Water	01/11/17 09:44	01/20/17 09:20
320-25173-4	167967	Water	01/11/17 09:24	01/20/17 09:20
320-25173-5	87319	Water	01/11/17 14:20	01/20/17 09:20
320-25173-6	168173	Water	01/11/17 16:39	01/20/17 09:20
320-25173-7	147486	Water	01/12/17 12:03	01/20/17 09:20
320-25173-8	167886	Water	01/12/17 13:07	01/20/17 09:20
320-25173-9	168432	Water	01/12/17 18:05	01/20/17 09:20
320-25173-10	168874	Water	01/13/17 12:35	01/20/17 09:20
320-25173-11	167631	Water	01/13/17 14:08	01/20/17 09:20
320-25173-12	407411	Water	01/16/17 11:26	01/20/17 09:20
320-25173-13	167754	Water	01/16/17 12:35	01/20/17 09:20
320-25173-14	168980	Water	01/16/17 14:48	01/20/17 09:20
320-25173-15	526576	Water	01/16/17 16:49	01/20/17 09:20
320-25173-16	87335	Water	01/16/17 12:27	01/20/17 09:20
320-25173-17	87408	Water	01/16/17 14:40	01/20/17 09:20
320-25173-18	87508	Water	01/16/17 14:30	01/20/17 09:20
320-25173-19	95630	Water	01/16/17 15:50	01/20/17 09:20
320-25173-20	168386	Water	01/17/17 12:20	01/20/17 09:20
320-25173-21	168378	Water	01/17/17 13:17	01/20/17 09:20
320-25173-22	168831	Water	01/17/17 13:22	01/20/17 09:20
320-25173-23	515 493-1	Water	01/17/17 14:39	01/20/17 09:20
320-25173-24	168483	Water	01/17/17 14:55	01/20/17 09:20
320-25173-25	515 493-2	Water	01/17/17 15:22	01/20/17 09:20
320-25173-26	167801	Water	01/18/17 16:44	01/20/17 09:20
320-25173-27	669077	Water	01/18/17 09:42	01/20/17 09:20
320-25173-28	87301	Water	01/18/17 10:32	01/20/17 09:20
320-25173-29	168271	Water	01/18/17 12:20	01/20/17 09:20
320-25173-30	168371	Water	01/18/17 12:10	01/20/17 09:20
320-25173-31	92924	Water	01/18/17 13:50	01/20/17 09:20
320-25173-32	167983	Water	01/18/17 14:40	01/20/17 09:20
320-25173-33	168254	Water	01/18/17 16:10	01/20/17 09:20



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(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800


CHAIN-OF-CUSTODY RECORD

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Page 1 of 24
Laboratory: Test America
Attn: David Alticker

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	PFOS/PFOA (WS-LC-0025)	Total Number of Containers	Remarks/Matrix
168491		1115	1/11/17	✓	✓		2	groundwater
168513		0954	1/11/17	✓	✓		2	
168613		0944	1/11/17	✓	✓		2	
167967		0924	1/11/17	✓	✓		2	
87319		1420	1/11/17	✓	✓		2	
168173		1639	1/11/17	✓	✓		2	
147486		1203	1/12/17	✓	✓		2	
167886		1307	1/12/17	✓	✓		2	
168432		1805	1/12/17	✓	✓		2	
168874		1235	1/13/17	✓	✓		2	

Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Project Number: <u>31-1-1735</u>	Total Number of Containers: <u>666</u>	Signature: <u>M. Nadel</u> Time: <u>1015</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Project Name: <u>GP Reg Fire Tr. Cont</u>	COC Seals/Intact? Y/N/NA: <u>—</u>	Printed Name: <u>Marcy Nadel</u> Date: <u>1/19/17</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Contact: <u>MDN</u>	Received Good Cond./Cold: <u>—</u>	Company: <u>Shannon & Wilson</u>	Company: _____	Company: _____
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: <u>Fed Ex</u>	Received By: 1.	Received By: 2.	Received By: 3.
Sampler: <u>PDD/APW/MDN</u>	(attach shipping bill, if any)	Signature: <u>Conor Edman</u> Time: <u>0920</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Instructions		Printed Name: <u>Conor Edman</u> Date: <u>1/20/17</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Requested Turnaround Time: <u>Standard</u>		Company: <u>TAWS</u>	Company: _____	Company: _____
Special Instructions: <u>Please bill to 1735-008</u>				
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File		320-25173 Chain of Custody		

CHAIN-OF-CUSTODY RECORD

Analysis Parameters/Sample Container Description (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Pres/PFA	WS-IL-0025	Total Number of Containers	Remarks/Matrix
167631		1408	1/13/17	✓	✓			2	groundwater
407411		1126	1/16/17	✓	✓			2	
167754		1235	1/16/17	✓	✓			2	
168980		1448	1/16/17	✓	✓			2	
526576		1649	1/16/17	✓	✓			2	
87335		1227	1/16/17	✓	✓			2	
87408		1440	1/16/17	✓	✓			2	
87508		1430	1/16/17	✓	✓			2	
95630		1550	1/16/17	✓	✓			2	
168386		1220	1/17/17	✓	✓			2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>81-1-11735</u>		Total Number of Containers: <u>666</u>		Signature: <u>M. J. Nadel</u> Time: <u>1015</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>CF Reg. File To Cont</u>		COC Seals/Intact? Y/N/NA: <u>-</u>		Printed Name: <u>Mary Nadel</u> Date: <u>1/19/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN</u>		Received Good Cond./Cold: _____		Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>FEDEX</u>		Received By: 1. Signature: <u>W. J. E.</u> Time: <u>0920</u>		Received By: 2. Signature: _____ Time: _____		Received By: 3. Signature: _____ Time: _____	
Sampler: <u>RDD/APW/MDN</u>		(attach shipping bill, if any)		Printed Name: <u>Connor E. Egan</u> Date: <u>1/24/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Instructions				Company: <u>TACWS</u>		Company: _____		Company: _____	
Requested Turnaround Time: <u>Standard</u>									
Special Instructions: <u>Please bill to 1735-008</u>									

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

4.36; 4.60

No. 34380

CHAIN-OF-CUSTODY RECORD

400 N. 34th Street, Suite 100
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(907) 561-2120

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

Analysis Parameters/Sample Container Description (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	PFOA/PFOA (WS-16-0025)	Total Number of Containers	Remarks/Matrix
168378		1317	1/17/17	✓	✓		2	Groundwater
168831		1322	1/17/17	✓	✓		2	
515493-1		1439	1/17/17	✓	✓		2	
168483		1455	1/17/17	✓	✓		2	
515493-2		1522	1/17/17	✓	✓		2	
167801		1644	1/18/17	✓	✓		2	
669077		0942	1/18/17	✓	✓		2	
87301		1032	1/18/17	✓	✓		2	
168271		1220	1/18/17	✓	✓		2	
168371		1210	1/18/17	✓	✓		2	

Project Information Project Number: <u>31-1-11735</u> Project Name: <u>CCF Reg Fire Tr. Cont.</u> Contact: <u>MDN</u> Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: <u>RDD/APW</u>		Sample Receipt Total Number of Containers: <u>666</u> COC Seals/Intact? Y/N/NA <u>—</u> Received Good Cond./Cold <u>—</u> Delivery Method: <u>FEDEX</u> (attach shipping bill, if any)		Relinquished By: 1. Signature: <u>M. Kaddel</u> Time: <u>1015</u> Printed Name: <u>Marcy Kaddel</u> Date: <u>1/19/17</u> Company: <u>Shannon & Wilson</u>		Relinquished By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Relinquished By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____	
Instructions Requested Turnaround Time: <u>Standard</u> Special Instructions: <u>Please bill to 1735-008</u>				Received By: 1. Signature: <u>W. L.</u> Time: <u>0920</u> Printed Name: <u>Connor Edman</u> Date: <u>1/20/17</u> Company: <u>TAW</u>		Received By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

4.3°C; 4.6°C

No. 34381

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

CHAIN-OF-CUSTODY RECORD

Page 4 of 4
Laboratory: Test America
Attn: David Allucke

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: 3H-11735		Total Number of Containers: 660		Signature: M. Nadel Time: 10:15		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: Cof Ray File Truwin		COC Seals/Intact? Y/N/NA: =		Printed Name: M. Nadel Date: 11/9/17		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: MDN		Received Good Cond./Cold: =		Company: Shannon & Wilson		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: FedEx		Received By: 1.		Received By: 2.		Received By: 3.	
Sampler: RDD		(attach shipping bill if any)		Signature: W. T. Edman Time: 0520		Signature: _____ Time: _____		Signature: _____ Time: _____	
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: Standard				Printed Name: Connor Edman Date: 11/20/17		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Special Instructions: Please bill to 1735-008				Company: T1405		Company: _____		Company: _____	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File									

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

4.3°C; 4.6%;

No. 34280

Login Sample Receipt Checklist

Client: Shannon & WilsonJmN

uomr 32 meQ - 610G75- D
STR r 32 meQ - 70775- G

Login Number: 25173

List Number: 1

Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
c avioaNiyitw' asnlk NheNkev o0is / -g maNk. 0b3nv as 2 eas30ev mwa s30yew 2 eteq	d0e	
dhe Nbole0s N3stovwsealJif p0esentJis intaN,	d0e	
Sa2 ple N3stovwsealsJif p0esentJa0e intaN,	r A	
dhe Nbole0o0sa2 ples vo not appea0to haye m0en Nb2 p0b2 isev o0 ta2 pe0ev ' ith,	d0e	
Sa2 ples ' e0e 0eNeyev on iN,	d0e	
Coole0de2 pe0at30e is aNNeptam,	d0e	
Coole0de2 pe0at30e is 0eNb0rev,	d0e	
COC is p0esent,	d0e	
COC is fillev o3t in in< anv le. imle,	d0e	
COC is fillev o3t ' ith all pe0inent info0 ation,	d0e	
Is the l ielv Sa2 ple0s na2 e p0esent on COCF	d0e	
dhe0e a0e no visN0epanNes met' een the N0ntaine0s 0eNeyev anv the COC,	d0e	
Sa2 ples a0e 0eNeyev ' ithin ? olvin. di2 e H0(N3vin. tests ' ith i2 2 eviate ? dsx	d0e	
Sa2 ple N0ntaine0s haye le. imle lamels,	d0e	
Containe0s a0e not n0w<en o0lea<in. ,	d0e	
Sa2 ple N0lleNion vate=i2 es a0e p0yivev,	d0e	
App0p0date sa2 ple N0ntaine0s a0e 3sev,	d0e	
Sa2 ple n0ttles a0e Nb2 pletelwfillev,	d0e	
Sa2 ple) 0ese0yation Pe0fiev,	r A	
dhe0e is s3ffiNent yol, fo0all 0eV3estev analwsesJinN, anw0eV3estev q S-q STs	d0e	
Containe0s 0eV3i0n. M0w heavspaNe haye no heavspaNe o0m8mle is / z2 2 H74"x	d0e	
q 3ltiphasiNsa2 ples a0e not p0esent,	d0e	
Sa2 ples vo not 0eV3i0e splittin. o0Nb2 positin. ,	d0e	
c esiv3al Chlo0ne CheNkev,	r A	

Laboratory Data Review Checklist

Completed by: Marcy Nadel

Title: Geologist Date: February 09, 2017

CS Report Name: City of Fairbanks Fire Training Area Report Date: February 03, 2017

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-25173-1_Rev1

ADEC File Number: 102.38.182 ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 ☒ NA (Please explain.) Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Correct analyses requested?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The temperature blank or cooler was measured within the acceptable temperature range of 0°C to 6°C upon receipt at the laboratory for both coolers, as specified in the EPA publication SW-846. This range has been approved by ADEC.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

There were no discrepancies identified by the laboratory.

- e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

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

☐ Yes ☒ No ☐ NA (Please explain.)

Comments:

The laboratory noted that the report was revised to report sample 167801 from sample re-extraction. Shannon & Wilson requested a re-extraction due to discrepancies between PFOS results with historical results for this location. The re-extraction results for both containers submitted to the laboratory confirmed an error in the initial calculation. The re-extraction result is reported in this report. The results were reported within hold time and qualification of the corrected result is not required.

The laboratory noted that there was insufficient sample volume to analyze a matrix spike (MS) and matrix spike duplicate (MSD) samples for preparation batches 320-147564 and 320-147563. A laboratory control sample (LCS) and LCS duplicate (LCSD) pair was extracted with each batch to demonstrate precision.

- c. Were all corrective actions documented?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

The laboratory did not state that any corrective actions were required.

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

Comments:

The laboratory did not specify any effect on data quality or usability.

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Soil samples were not submitted with this work order.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The PQL, equivalent to the TestAmerica reporting limit (RL), is less than the applicable EPA lifetime drinking water health advisory levels and ADEC groundwater-cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Comments:

None; PFCs were not detected in method blanks.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were 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 ☐ NA (Please explain.)

Comments:

LCS/LCSD sample results were reported.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries were within the ranges required by the laboratory method.

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 ☐ NA (Please explain.)

Comments:

The RPDs were within the laboratory limit.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification was not required; see above.

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

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries for surrogates are within the laboratory limits.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification was not required; see above.

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

Comments:

The data quality and usability were not affected.

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 ☒ NA (Please explain.)

Comments:

PFCs are not volatile compounds, therefore, a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC?
(If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

A trip blank was not required; see above.

- iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

A trip blank was not required.

- iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required.

- v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Field-duplicate pairs 168513/168613, 87408/87508, and 168271/168371 were submitted with 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 ☐ NA (Please explain.) Comments:

The field duplicate RPDs are within the recommended water DQO of 30%.

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

Comments:

The data quality and usability were not affected; see above.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Reusable equipment was not utilized during sample collection for this WO; therefore an equipment blank is not required.

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

An equipment blank was not submitted with this WO.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

There were no other data qualifiers used.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-25288-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

2/3/2017 1:20:17 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



Visit us at:

www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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Laboratory: TestAmerica Sacramento

Job Narrative
320-25288-1

r he saJ 7les 5ele benipewon Pyovyo- Pd 6:2- cM; the saJ 7les attipewin GownonwitonT7b7etf 7beselpewanwT5hebe te, qibewTon ineu
r he teJ 7ebate ofthe molebat benit 5as 9U. Cu

Methow4s j kcS: r he saJ 7le 5ele analf (ewDf the wibent in/ention J ethowFollo5inGr estcJ ebma SantaJ ento) Stanwabwz 7ebatinG
i bonewqte 4Sz j °TWS8 C8 - 09 Oepu0uP li ebFqobinatew CoJ 7ogrnws 4 kCs° in WatebTSoilsTSewJ ents anwr issgeR

“no additional analytical objectives are noted other than those described in the 3 definitions” loss of 7a

Methow4⁶j kcS j be7: Ansqffmient saJ 7le polqJ e 5as apailaDie to 7et5bJ a J attbNs7igeyJ attbNs7ige wq7limate 4MSyMS3^o assomiatew
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Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 16748

Lab Sample ID: 320-24299-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	17		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	13		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 819416

Lab Sample ID: 320-24299-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	21		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 815069

Lab Sample ID: 320-24299-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.9		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	21		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 437219

Lab Sample ID: 320-24299-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	28		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 867610

Lab Sample ID: 320-24299-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	23		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	270		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 819923

Lab Sample ID: 320-24299-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	8.8		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	100		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 819523

Lab Sample ID: 320-24299-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	9.1		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 819721

Lab Sample ID: 320-24299-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	5.4		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	43		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 819617

Lab Sample ID: 320-24299-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	27		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	230		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 68457

Date Collected: 07/07/17 12:56

Date Received: 07/26/17 01:30

Lab Sample ID: 320-25211-7

9 at Mr : x ate

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic (PFOA)	74		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 16:09	1
Perfluorooctanesulfonic (PFOS)	73		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 16:09	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	132		52 - 120				01/30/17 08:02	01/30/17 19:05	1
13C4 PFOS	138		52 - 120				01/30/17 08:02	01/30/17 19:05	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 761568

Date Collected: 07/04/2017 15:74

Date Received: 07/06/2017 01:30

Lab Sample ID: 320-25211-2

9 at Mr : x ate

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic acid (PFOA)	27		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 16:28	1
Perfluorooctanesulfonic acid (PFOS)	770		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 16:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	130		52 - 120				01/30/17 08:02	01/30/17 19:58	1
13C4 PFOS	15S		52 - 120				01/30/17 08:02	01/30/17 19:58	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 76/ 081

Date Collected: 07/20/14 70:38

Date Received: 07/26/14 01:30

Lab Sample ID: 320-25211-3

9 at Mr : x ateM

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic (PFOA)	2.1		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 16:46	1
Perfluorooctanesulfonic (PFOS)	27		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 16:46	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	141		52 - 120				01/30/17 08:02	01/30/17 19:49	1
13C4 PFOS	141		52 - 120				01/30/17 08:02	01/30/17 19:49	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 534261

Date Collected: 07/20/17 78:20

Date Received: 07/26/17 01:30

Lab Sample ID: 320-25211-8

9 at Mr : x ate

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic (PFOA)	21		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 17:05	1
Perfluorooctanesulfonic (PFOS)	770		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 17:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	135		52 - 120				01/30/17 08:02	01/30/17 17:02	1
13C4 PFOS	157		52 - 120				01/30/17 08:02	01/30/17 17:02	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 784860

Date Collected: 07/20/17 17:55

Date Received: 07/26/17 07:30

Lab Sample ID: 320-25211-5

9 atM : x ateM

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic (PFOA)	23		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 17:23	1
Perfluorooctanesulfonic (PFOS)	240		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 17:23	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	132		52 - 120				01/30/17 08:02	01/30/17 17:53	1
13C4 PFOS	131		52 - 120				01/30/17 08:02	01/30/17 17:53	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 761123

Date Collected: 07/23/14 10:32

Date Received: 07/26/14 01:30

Lab Sample ID: 320-25211-6

9 at Mr : x ate

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic (PFOA)	1.1		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 18:00	1
Perfluorooctanesulfonic (PFOS)	700		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 18:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	143		52 - 120				01/30/17 08:02	01/30/17 18:00	1
13C4 PFOS	144		52 - 120				01/30/17 08:02	01/30/17 18:00	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 761/ 23

Date Collected: 07/23/17 10:22

Date Received: 07/26/17 01:30

Lab Sample ID: 320-25211-4

9 at 11: x at 11

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic (PFOA)	1.7		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 18:18	1
Perfluorooctanesulfonic (PFOS)	770		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 18:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	131		52 - 120				01/30/17 08:02	01/30/17 18:18	1
13C4 PFOS	133		52 - 120				01/30/17 08:02	01/30/17 18:18	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 761426

Date Collected: 07/28/14 11:00

Date Received: 07/26/14 01:30

Lab Sample ID: 320-25211-1

9 at Mr : x ateM

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic (PFOA)	5.8		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 18:36	1
Perfluorooctanesulfonic (PFOS)	83		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 18:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	152		52 - 120				01/30/17 08:02	01/30/17 18:39	1
13C4 PFOS	157		52 - 120				01/30/17 08:02	01/30/17 18:39	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Client Sample ID: 761864

Date Collected: 07/25/14 07:53

Date Received: 07/26/14 07:30

Lab Sample ID: 320-25211-1
9 at Mr : x ateM

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic (PFOA)	24		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 18:55	1
Perfluorooctanesulfonic (PFOS)	230		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 18:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	159		52 - 120				01/30/17 08:02	01/30/17 18:22	1
13C4 PFOS	152		52 - 120				01/30/17 08:02	01/30/17 18:22	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	3C4 PFO/ (25-150)	3C4 PFO/ (25-150)
320-25288-1	64751	135	138
320-25288-2	168564	130	129
320-25288-3	169048	141	141
320-25288-4	537268	132	127
320-25288-5	147460	135	131
320-25288-6	168823	143	144
320-25288-7	168923	131	133
320-25288-8	168726	125	127
320-25288-9	168467	126	125
LCS 320-148189/2-A	Lab Control Sample	139	139
LCSD 320-148189/3-A	Lab Control Sample Dup	142	146
MB 320-148189/1-A	Method Blank	138	134
Surrogate Legend			
13C4 PFOA = 13C4 PFOA			
13C4 PFOS = 13C4 PFOS			

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-148189/1-A

Matrix: Water

Analysis Batch: 148296

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 148189

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		01/30/17 08:05	01/30/17 14:38	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		01/30/17 08:05	01/30/17 14:38	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	138		25 - 150				01/30/17 08:05	01/30/17 14:38	1
13C4 PFOS	134		25 - 150				01/30/17 08:05	01/30/17 14:38	1

Lab Sample ID: LCS 320-148189/2-A

Matrix: Water

Analysis Batch: 148296

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 148189

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	15.9		ng/L		79	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	14.0		ng/L		76	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	139		25 - 150				
13C4 PFOS	139		25 - 150				

Lab Sample ID: LCSD 320-148189/3-A

Matrix: Water

Analysis Batch: 148296

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 148189

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	15.5		ng/L		78	63 - 141	2	30
Perfluorooctanesulfonic acid (PFOS)	18.6	14.0		ng/L		76	47 - 162	0	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	142		25 - 150						
13C4 PFOS	146		25 - 150						

TestAmerica Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

LCMS

Prep Batch: 148189

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25288-1	64751	Total/NA	Water	PFAS Prep	
320-25288-2	168564	Total/NA	Water	PFAS Prep	
320-25288-3	169048	Total/NA	Water	PFAS Prep	
320-25288-4	537268	Total/NA	Water	PFAS Prep	
320-25288-5	147460	Total/NA	Water	PFAS Prep	
320-25288-6	168823	Total/NA	Water	PFAS Prep	
320-25288-7	168923	Total/NA	Water	PFAS Prep	
320-25288-8	168726	Total/NA	Water	PFAS Prep	
320-25288-9	168467	Total/NA	Water	PFAS Prep	
MB 320-148189/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-148189/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-148189/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 148296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25288-1	64751	Total/NA	Water	PFAS	148189
320-25288-2	168564	Total/NA	Water	PFAS	148189
320-25288-3	169048	Total/NA	Water	PFAS	148189
320-25288-4	537268	Total/NA	Water	PFAS	148189
320-25288-5	147460	Total/NA	Water	PFAS	148189
320-25288-6	168823	Total/NA	Water	PFAS	148189
320-25288-7	168923	Total/NA	Water	PFAS	148189
320-25288-8	168726	Total/NA	Water	PFAS	148189
320-25288-9	168467	Total/NA	Water	PFAS	148189
MB 320-148189/1-A	Method Blank	Total/NA	Water	PFAS	148189
LCS 320-148189/2-A	Lab Control Sample	Total/NA	Water	PFAS	148189
LCSD 320-148189/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	148189

Lab Chronicle

Client: Shannon & Wilson
 j b/entySite: Cttf oFkailDangs kite r bainingp cbea

restcJ ebina l oDAB : 20- 4060114P

Client Sample ID: 16849

Date Collecte/ : 095R98 92:41

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM9

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j tæB	j kcS j tæB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	c nalf sis	j kcS		P			P. 1078	- P2- yPL P8:- 7	S=,	r cNScC

Client Sample ID: 91M16

Date Collecte/ : 095R98 94:98

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM2

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j tæB	j kcS j tæB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	c nalf sis	j kcS		P			P. 1078	- P2- yPL P8:01	S=,	r cNScC

Client Sample ID: 91R06M

Date Collecte/ : 0952098 90:36

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM3

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j tæB	j kcS j tæB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	c nalf sis	j kcS		P			P. 1078	- P2- yPL P8: 8	S=,	r cNScC

Client Sample ID: 43821M

Date Collecte/ : 0952098 96:20

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM6

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j tæB	j kcS j tæB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	c nalf sis	j kcS		P			P. 1078	- P2- yPL PL:- 6	S=,	r cNScC

Client Sample ID: 968610

Date Collecte/ : 0952098 94:64

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM4

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j tæB	j kcS j tæB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	c nalf sis	j kcS		P			P. 1078	- P2- yPL PL:02	S=,	r cNScC

Client Sample ID: 91MM23

Date Collecte/ : 0952398 90:32

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM1

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j tæB	j kcS j tæB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	c nalf sis	j kcS		P			P. 1078	- P2- yPL P1:-	S=,	r cNScC

restcJ ebina SantaJ ento

Lab Chronicle

Client: Shannon & WilsonTAm
 j b/entySite: Cttf oFkaltDangs kite r baininp c bea

r estcJ elbna l oDA8 : 20- 4060114P

Client Sample ID: 91MR23

Date Collecte/ : 0952358 90:22

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM-8

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j beB	j kcS j beB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	cnalf sis	j kcS		P			P. 1078	- P2- yPL P1:P1	S=,	r cNScC

Client Sample ID: 91M821

Date Collecte/ : 0952658 9M00

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM-8

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j beB	j kcS j beB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	cnalf sis	j kcS		P			P. 1078	- P2- yPL P1:28	S=,	r cNScC

Client Sample ID: 91M618

Date Collecte/ : 0952458 0R:43

Date v ecei7e/ : 0952158 0R:30

Lab Sample ID: 320-242MM-8

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalyEc	j beB	j kcS j beB			PR- J N	PR8 J N	P. 1P17	- P2- yPL - 1:- 6	CC5	r cNScC
r otalyEc	cnalf sis	j kcS		P			P. 1078	- P2- yPL P1:66	S=,	r cNScC

Laboratory v eferences:

r cNScC v r estcJ elbna SantaJ entoT11- , idebsive j atg9af TWest SantaJ entoTCc 768- 6Tr =N(7P8)2L248- -

r estcJ elbna SantaJ ento

Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-17
Arkansas DEQ	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-17
Connecticut	State Program	1	PH-0691	06-30-17
Florida	NELAP	4	E87570	06-30-17
Hawaii	State Program	9	N/A	01-31-17 *
Illinois	NELAP	5	200060	03-17-17
Kansas	NELAP	7	E-10375	10-31-17
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-17
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-17
New Jersey	NELAP	2	CA005	06-30-17
New York	NELAP	2	11666	04-01-17
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-17
Texas	NELAP	6	T104704399	07-31-17
US Fish & Wildlife	Federal		LE148388-0	10-31-17
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-17
Virginia	NELAP	3	460278	03-14-17
Washington	State Program	10	C581	05-05-17
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-29-17 *

* Certification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Method	Method Description	Protocol	Laboratory
PFAS	Perfluorinated Alkyl Substances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25288-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-25288-1	64751	Water	01/19/17 12:56	01/26/17 09:30
320-25288-2	168564	Water	01/19/17 15:17	01/26/17 09:30
320-25288-3	169048	Water	01/20/17 10:34	01/26/17 09:30
320-25288-4	537268	Water	01/20/17 14:20	01/26/17 09:30
320-25288-5	147460	Water	01/20/17 15:45	01/26/17 09:30
320-25288-6	168823	Water	01/23/17 10:32	01/26/17 09:30
320-25288-7	168923	Water	01/23/17 10:22	01/26/17 09:30
320-25288-8	168726	Water	01/24/17 18:00	01/26/17 09:30
320-25288-9	168467	Water	01/25/17 09:53	01/26/17 09:30



320-25288 Chain of Custody



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(314) 699-9660

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(907) 561-2120

1321 Bannock Street, Suite 200
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CHAIN-OF-CUSTODY RECORD

Laboratory Test America Page 1 of 1
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	PPS (PFAD)	W3-LC-DD25	Total Number of Containers	Remarks/Matrix
64751		1256	1/19/17	✓	✓			2	gravel
168564		1517	1/19/17	✓	✓			2	
169048		1034	1/20/17	✓	✓			2	
537268		1420	1/20/17	✓	✓			2	
147460		1545	1/20/17	✓	✓			2	
168823		1032	1/23/17	✓	✓			2	
168923		1022	1/23/17	✓	✓			2	
168726		1800	1/24/17	✓	✓			2	
168467		0953	1/25/17	✓	✓			2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735</u>		Total Number of Containers: <u>18</u>		Signature: <u>M. Nade</u> Time: <u>1030</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>COFR Fire Tr Cdr</u>		COC Seals/Intact? Y/N/NA: <u>—</u>		Printed Name: <u>Marcy Nade</u> Date: <u>1/25/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN</u>		Received Good Cond./Cold: <u>—</u>		Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>FedEx</u>		Received By: 1.		Received By: 2.		Received By: 3.	
Sampler: <u>RDD/MDN</u>		(attach shipping bill, if any)		Signature: <u>Jim J...</u> Time: <u>0930</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Requested Turnaround Time: <u>Standard</u>		Special Instructions: <u>Please bill to 31-1-11735 -008</u>		Printed Name: <u>Troy G. Turpen</u> Date: <u>1/26/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File				Company: <u>TAW</u> <u>5.5°C gel ice</u>		Company: _____		Company: _____	

No. 34292



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-25288-1

Login Number: 25288

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

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

Laboratory Data Review Checklist

Completed by: Michael Jaramillo

Title: Environmental Chemist IV Date: February 09, 2017

CS Report Name: City of Fairbanks Fire Training Area Report Date: February 01, 2017

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-25173-1

ADEC File Number: 102.38.182 ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

ADEC has not approved an analytical laboratory for perfluorinated compounds. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 ☒ NA (Please explain.) Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Correct analyses requested?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The temperature blank or cooler was measured within the acceptable temperature range of 0°C to 6°C upon receipt at the laboratory for the cooler, as specified in the EPA publication SW-846. This range has been approved by ADEC.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

There were no discrepancies identified by the laboratory.

- e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

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

☐ Yes ☒ No ☐ NA (Please explain.)

Comments:

The laboratory noted that there was insufficient sample volume to analyze a matrix spike (MS) and matrix spike duplicate (MSD) samples for preparation batch 320-148189. A laboratory control sample (LCS) and LCS duplicate (LCSD) pair was extracted with each batch to demonstrate accuracy and precision.

- c. Were all corrective actions documented?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

The laboratory did not state that any corrective actions were required.

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

Comments:

The laboratory did not specify any effect on data quality or usability.

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

- c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Soil samples were not submitted with this work order.

- d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The PQL, equivalent to the TestAmerica reporting limit (RL), is less than the applicable EPA lifetime drinking water health advisory levels and ADEC groundwater-cleanup levels for PFOS and PFOA.

- e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

- a. Method Blank

- i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- iii. If above PQL, what samples are affected?

Comments:

N/A; PFCs were not detected in method blanks.

- iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Qualification of the results was not required; see above.

- v. Data quality or usability affected? (Please explain.)
Comments:

The data quality and usability were 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 ☐ NA (Please explain.) Comments:

LCS/LCSD sample results were reported for PFC analysis.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Metals and inorganics analyses were not requested for 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 ☐ NA (Please explain.) Comments:

Percent recoveries met the laboratory's acceptance criteria.

- 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 ☐ NA (Please explain.) Comments:

The RPDs met the laboratory's acceptance criteria.

- v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments:

N/A; the percent recoveries and RPDs met the laboratory's acceptance criteria.

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

The percent recoveries and RPDs met the laboratory's acceptance criteria.

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

Comments:

The data quality and usability were unaffected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The analytical method WS-LC-0025 uses an isotope dilution method, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries for surrogates are met the laboratory's acceptance criteria.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification was not required; see above.

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

Comments:

The data quality and usability were unaffected.

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 ☒ NA (Please explain.)

Comments:

PFCs are not volatile compounds; a trip blank is not required for this work order.

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 ☒ NA (Please explain.)

Comments:

A trip blank was not required for this work order.

iii. All results less than PQL?
☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required for this work order.

iv. If above PQL, what samples are affected?

Comments:

N/A; a trip blank was not required for this work order.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?
☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

ii. Submitted blind to lab?
☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The field-duplicate pair '168823'/'168923' was submitted with 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 ☐ NA (Please explain.)

Comments:

The field duplicate RPDs are within the recommended water DQO of 30%.

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

Comments:

The data quality and usability were unaffected; see above.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Reusable equipment was not used during sample collection for this work order (WO), so an equipment blank was not required.

i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

An equipment blank was not submitted with this WO.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were unaffected.

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

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

There were no other data qualifiers used.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-25707-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

2/22/2017 12:48:12 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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results through

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Qualifiers

LCMS

Qualifier	Qualifier Description
-----------	-----------------------

J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
---	--

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
--------------	---

α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson
Site: Citif oFkailDangs kibe r baininGc bea

restcJ ebina l oD A8 : 20- 8091- 18P

Job ID: 320-25707-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-25707-1

Comments

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Receipt

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Receipt Exceptions

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LCMS

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Organic Prep

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Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 266311

Lab Sample ID: 320-25707-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.4		2.0	0.87	ng/L		1		PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.82	J	2.0	0.80	ng/L		1		PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	2.4		2.0	0.75	ng/L		1		PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.7		2.0	1.3	ng/L		1		PFAS	Total/NA

Client Sample ID: 267317

Lab Sample ID: 320-25707-2

No Detections.

Client Sample ID: 553239

Lab Sample ID: 320-25707-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.7	J	2.0	0.92	ng/L		1		PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.1		2.0	0.87	ng/L		1		PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.88	J	2.0	0.80	ng/L		1		PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	1.8	J	2.0	0.75	ng/L		1		PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.2		2.0	1.3	ng/L		1		PFAS	Total/NA

Client Sample ID: 267309

Lab Sample ID: 320-25707-4

No Detections.

Client Sample ID: 564681

Lab Sample ID: 320-25707-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.9	J	2.0	0.92	ng/L		1		PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.7		2.0	0.87	ng/L		1		PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L		1		PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.7		2.0	1.3	ng/L		1		PFAS	Total/NA

Client Sample ID: 540331-1

Lab Sample ID: 320-25707-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.8		2.0	0.92	ng/L		1		PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	14		2.0	0.87	ng/L		1		PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.2		2.0	0.80	ng/L		1		PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	4.7		2.0	0.75	ng/L		1		PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	22		2.0	1.3	ng/L		1		PFAS	Total/NA
Perfluorononanoic acid (PFNA)	1.3	J	2.0	0.65	ng/L		1		PFAS	Total/NA

Client Sample ID: 260835

Lab Sample ID: 320-25707-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.89	J	2.0	0.75	ng/L		1		PFAS	Total/NA

Client Sample ID: 655955

Lab Sample ID: 320-25707-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L		1		PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.9		2.0	0.87	ng/L		1		PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L		1		PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 655955 (Continued)

Lab Sample ID: 320-25707-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	4.0		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 267040

Lab Sample ID: 320-25707-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.8		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	2.4		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.5		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 266311

Date Collected: 02/06/17 10:43

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		02/14/17 07:57	02/15/17 06:11	1
Perfluorohexanesulfonic acid (PFHxS)	2.4		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 06:11	1
Perfluoroheptanoic acid (PFHpA)	0.82	J	2.0	0.80	ng/L		02/14/17 07:57	02/15/17 06:11	1
Perfluorooctanoic acid (PFOA)	2.4		2.0	0.75	ng/L		02/14/17 07:57	02/15/17 06:11	1
Perfluorooctanesulfonic acid (PFOS)	3.7		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 06:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 06:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		25 - 150				02/16/17 0:35	02/15/17 0C311	1
14p 6-PFHA9	10N		25 - 150				02/16/17 0:35	02/15/17 0C311	1
14p 6 PFO9	112		25 - 150				02/16/17 0:35	02/15/17 0C311	1
14p 6 PFOS	106		25 - 150				02/16/17 0:35	02/15/17 0C311	1
14p 5 PF79	120		25 - 150				02/16/17 0:35	02/15/17 0C311	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 267317

Date Collected: 02/06/17 11:28

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-2

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		02/14/17 07:57	02/15/17 06:30	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 06:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		02/14/17 07:57	02/15/17 06:30	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		02/14/17 07:57	02/15/17 06:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 06:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 06:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	114		25 - 150				02/16/17 0:35	02/15/17 06:30	1
14p 6-PFHA9	115		25 - 150				02/16/17 0:35	02/15/17 06:30	1
14p 6 PFO9	115		25 - 150				02/16/17 0:35	02/15/17 06:30	1
14p 6 PFOS	112		25 - 150				02/16/17 0:35	02/15/17 06:30	1
14p 5 PF79	120		25 - 150				02/16/17 0:35	02/15/17 06:30	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 553239

Date Collected: 02/06/17 14:29

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-3

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.7	J	2.0	0.92	ng/L		02/14/17 07:57	02/15/17 06:48	1
Perfluorohexanesulfonic acid (PFHxS)	4.1		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 06:48	1
Perfluoroheptanoic acid (PFHpA)	0.88	J	2.0	0.80	ng/L		02/14/17 07:57	02/15/17 06:48	1
Perfluorooctanoic acid (PFOA)	1.8	J	2.0	0.75	ng/L		02/14/17 07:57	02/15/17 06:48	1
Perfluorooctanesulfonic acid (PFOS)	9.2		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 06:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 06:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	100		25 - 150				02/16/17 07:35	02/15/17 06:38	1
14p 6-PFHA9	106		25 - 150				02/16/17 07:35	02/15/17 06:38	1
14p 6 PFO9	102		25 - 150				02/16/17 07:35	02/15/17 06:38	1
14p 6 PFOS	102		25 - 150				02/16/17 07:35	02/15/17 06:38	1
14p 5 PF79	112		25 - 150				02/16/17 07:35	02/15/17 06:38	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 267309

Date Collected: 02/06/17 15:08

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-4

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		02/14/17 07:57	02/15/17 07:06	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 07:06	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		02/14/17 07:57	02/15/17 07:06	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		02/14/17 07:57	02/15/17 07:06	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 07:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 07:06	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		25 - 150	02/16/17 0:35	02/15/17 0:30C	1
14p 6-PFHA9	10N		25 - 150	02/16/17 0:35	02/15/17 0:30C	1
14p 6 PFO9	106		25 - 150	02/16/17 0:35	02/15/17 0:30C	1
14p 6 PFOS	100		25 - 150	02/16/17 0:35	02/15/17 0:30C	1
14p 5 PF79	116		25 - 150	02/16/17 0:35	02/15/17 0:30C	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 564681

Date Collected: 02/07/17 09:25

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-5

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.9	J	2.0	0.92	ng/L		02/14/17 07:57	02/15/17 07:25	1
Perfluorohexanesulfonic acid (PFHxS)	5.7		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 07:25	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		02/14/17 07:57	02/15/17 07:25	1
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L		02/14/17 07:57	02/15/17 07:25	1
Perfluorooctanesulfonic acid (PFOS)	9.7		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 07:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 07:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	105		25 - 150				02/16/17 0:35	02/15/17 0:35	1
14p 6-PFHA9	116		25 - 150				02/16/17 0:35	02/15/17 0:35	1
14p 6 PFO9	10N		25 - 150				02/16/17 0:35	02/15/17 0:35	1
14p 6 PFOS	104		25 - 150				02/16/17 0:35	02/15/17 0:35	1
14p 5 PF79	114		25 - 150				02/16/17 0:35	02/15/17 0:35	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 540331-1

Date Collected: 02/07/17 11:40

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-6

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.8		2.0	0.92	ng/L		02/14/17 07:57	02/15/17 07:43	1
Perfluorohexanesulfonic acid (PFHxS)	14		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 07:43	1
Perfluoroheptanoic acid (PFHpA)	7.2		2.0	0.80	ng/L		02/14/17 07:57	02/15/17 07:43	1
Perfluorooctanoic acid (PFOA)	4.7		2.0	0.75	ng/L		02/14/17 07:57	02/15/17 07:43	1
Perfluorooctanesulfonic acid (PFOS)	22		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 07:43	1
Perfluorononanoic acid (PFNA)	1.3	J	2.0	0.65	ng/L		02/14/17 07:57	02/15/17 07:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 150				02/16/17 0:35	02/15/17 0:34	1
14p 6-PFHA9	114		25 - 150				02/16/17 0:35	02/15/17 0:34	1
14p 6 PFO9	111		25 - 150				02/16/17 0:35	02/15/17 0:34	1
14p 6 PFOS	10:		25 - 150				02/16/17 0:35	02/15/17 0:34	1
14p 5 PF79	110		25 - 150				02/16/17 0:35	02/15/17 0:34	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 260835

Date Collected: 02/07/17 15:30

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-7

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		02/14/17 07:57	02/15/17 08:02	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 08:02	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		02/14/17 07:57	02/15/17 08:02	1
Perfluorooctanoic acid (PFOA)	0.89	J	2.0	0.75	ng/L		02/14/17 07:57	02/15/17 08:02	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 08:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 08:02	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	106		25 - 150	02/16/17 0:35	02/15/17 08:02	1
14p 6-PFHA9	112		25 - 150	02/16/17 0:35	02/15/17 08:02	1
14p 6 PFO9	106		25 - 150	02/16/17 0:35	02/15/17 08:02	1
14p 6 PFOS	101		25 - 150	02/16/17 0:35	02/15/17 08:02	1
14p 5 PF79	110		25 - 150	02/16/17 0:35	02/15/17 08:02	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 655955

Date Collected: 02/08/17 13:14

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-8

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L		02/14/17 07:57	02/15/17 08:38	1
Perfluorohexanesulfonic acid (PFHxS)	3.9		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 08:38	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		02/14/17 07:57	02/15/17 08:38	1
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L		02/14/17 07:57	02/15/17 08:38	1
Perfluorooctanesulfonic acid (PFOS)	4.0		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 08:38	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 08:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	101		25 - 150				02/16/17 0:35	02/15/17 08:38	1
14p 6-PFHA9	106		25 - 150				02/16/17 0:35	02/15/17 08:38	1
14p 6 PF09	N8		25 - 150				02/16/17 0:35	02/15/17 08:38	1
14p 6 PFOS	N5		25 - 150				02/16/17 0:35	02/15/17 08:38	1
14p 5 PF79	105		25 - 150				02/16/17 0:35	02/15/17 08:38	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Client Sample ID: 267040

Date Collected: 02/08/17 14:18

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25707-9

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L		02/14/17 07:57	02/15/17 08:57	1
Perfluorohexanesulfonic acid (PFHxS)	4.8		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 08:57	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		02/14/17 07:57	02/15/17 08:57	1
Perfluorooctanoic acid (PFOA)	2.4		2.0	0.75	ng/L		02/14/17 07:57	02/15/17 08:57	1
Perfluorooctanesulfonic acid (PFOS)	9.5		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 08:57	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 08:57	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	10N		25 - 150				02/16/17 07:57	02/15/17 08:57	1
14p 6-PFHA9	116		25 - 150				02/16/17 07:57	02/15/17 08:57	1
14p 6 PFO9	108		25 - 150				02/16/17 07:57	02/15/17 08:57	1
14p 6 PFOS	110		25 - 150				02/16/17 07:57	02/15/17 08:57	1
14p 5 PF79	118		25 - 150				02/16/17 07:57	02/15/17 08:57	1

TestAmerica Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		¹⁸ O ₂ PFHx (25-150)	¹³ C ₄ -PFHp (25-150)	¹³ C ₄ PFO (25-150)	¹³ C ₄ PFO (25-150)	¹³ C ₅ PFNA (25-150)
320-25707-1	266311	103	109	112	104	120
320-25707-2	267317	113	115	115	112	120
320-25707-3	553239	100	104	102	102	112
320-25707-4	267309	103	109	104	100	114
320-25707-5	564681	105	114	109	103	113
320-25707-6	540331-1	110	113	111	107	110
320-25707-7	260835	104	112	104	101	110
320-25707-8	655955	101	104	98	95	105
320-25707-9	267040	109	114	108	110	118
LCS 320-150378/2-A	Lab Control Sample	115	116	116	114	120
LCSD 320-150378/3-A	Lab Control Sample Dup	103	106	107	103	109
MB 320-150378/1-A	Method Blank	105	110	108	106	110

Surrogate Legend

¹⁸O₂ PFHxS = ¹⁸O₂ PFHxS
¹³C₄-PFHpA = ¹³C₄-PFHpA
¹³C₄ PFOA = ¹³C₄ PFOA
¹³C₄ PFOS = ¹³C₄ PFOS
¹³C₅ PFNA = ¹³C₅ PFNA

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-150378/1-A

Matrix: Water

Analysis Batch: 150653

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 150378

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		02/14/17 07:57	02/15/17 05:16	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		02/14/17 07:57	02/15/17 05:16	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		02/14/17 07:57	02/15/17 05:16	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		02/14/17 07:57	02/15/17 05:16	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		02/14/17 07:57	02/15/17 05:16	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		02/14/17 07:57	02/15/17 05:16	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		24 5140	02-13-1/ 0/ 64/	02-14-1/ 0461:	1
1Qp 3 ³⁵ PFHA9	110		24 5140	02-13-1/ 0/ 64/	02-14-1/ 0461:	1
1Qp 3 PFO9	108		24 5140	02-13-1/ 0/ 64/	02-14-1/ 0461:	1
1Qp 3 PFOS	10:		24 5140	02-13-1/ 0/ 64/	02-14-1/ 0461:	1
1Qp 4 PFN9	110		24 5140	02-13-1/ 0/ 64/	02-14-1/ 0461:	1

Lab Sample ID: LCS 320-150378/2-A

Matrix: Water

Analysis Batch: 150653

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 150378

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	17.2		ng/L		98	55 - 147
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.2		ng/L		94	58 - 138
Perfluoroheptanoic acid (PFHpA)	20.0	20.3		ng/L		101	63 - 135
Perfluorooctanoic acid (PFOA)	20.0	18.2		ng/L		91	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	16.7		ng/L		90	47 - 162
Perfluorononanoic acid (PFNA)	20.0	19.4		ng/L		97	71 - 140

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	114		24 5140
1Qp 3 ³⁵ PFHA9	11:		24 5140
1Qp 3 PFO9	11:		24 5140
1Qp 3 PFOS	113		24 5140
1Qp 4 PFN9	120		24 5140

Lab Sample ID: LCSD 320-150378/3-A

Matrix: Water

Analysis Batch: 150653

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 150378

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limit	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.6		ng/L		100	55 - 147	2	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.5		ng/L		102	58 - 138	8	30
Perfluoroheptanoic acid (PFHpA)	20.0	21.0		ng/L		105	63 - 135	3	30
Perfluorooctanoic acid (PFOA)	20.0	18.9		ng/L		94	63 - 141	3	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.4		ng/L		94	47 - 162	4	30
Perfluorononanoic acid (PFNA)	20.0	19.9		ng/L		99	71 - 140	3	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc

Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
18O2 PFHxS	10C		24 5140
1Qp 3 PFHA9	10:		24 5140
1Qp 3 PFO9	10/		24 5140
1Qp 3 PFOS	10C		24 5140
1Qp 4 PFN9	107		24 5140

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25808-1

LCMS

Prep Batch: 150378

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25808-1	266311	Total/4 A	Water	PFAS Prep	
320-25808-2	268318	Total/4 A	Water	PFAS Prep	
320-25808-3	553237	Total/4 A	Water	PFAS Prep	
320-25808-N	268307	Total/4 A	Water	PFAS Prep	
320-25808-5	56N691	Total/4 A	Water	PFAS Prep	
320-25808-6	5N0331-1	Total/4 A	Water	PFAS Prep	
320-25808-8	260935	Total/4 A	Water	PFAS Prep	
320-25808-9	655755	Total/4 A	Water	PFAS Prep	
320-25808-7	2680N0	Total/4 A	Water	PFAS Prep	
MB 320-150389/1-A	Method Blank	Total/4 A	Water	PFAS Prep	
LCS 320-150389/2-A	Lab Control Sample	Total/4 A	Water	PFAS Prep	
LCSD 320-150389/3-A	Lab Control Sample Dup	Total/4 A	Water	PFAS Prep	

Analysis Batch: 150653

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25808-1	266311	Total/4 A	Water	PFAS	150389
320-25808-2	268318	Total/4 A	Water	PFAS	150389
320-25808-3	553237	Total/4 A	Water	PFAS	150389
320-25808-N	268307	Total/4 A	Water	PFAS	150389
320-25808-5	56N691	Total/4 A	Water	PFAS	150389
320-25808-6	5N0331-1	Total/4 A	Water	PFAS	150389
320-25808-8	260935	Total/4 A	Water	PFAS	150389
320-25808-9	655755	Total/4 A	Water	PFAS	150389
320-25808-7	2680N0	Total/4 A	Water	PFAS	150389
MB 320-150389/1-A	Method Blank	Total/4 A	Water	PFAS	150389
LCS 320-150389/2-A	Lab Control Sample	Total/4 A	Water	PFAS	150389
LCSD 320-150389/3-A	Lab Control Sample Dup	Total/4 A	Water	PFAS	150389

Lab Chronicle

Client: Shannon & Wilson
 j b/entySite: Cttf oFkailDangs kite r bainingp cbea

restcJ ebina l oDAB : 20- 4061- 14P

Client Sample ID: 166844

Date CollecteW 9106d0 49:/ 8

Date 5eceiReW 91d8d0 9v:12

Lab Sample ID: 81931209034

- atriM x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepereW or PnalTueW	PnalTAat	Lab
r otaly7 c	j tEB	j kcS j tEB			PE - J N	PERR J N	P6- 21.	- 0yPLYP1 - 1:61	CC5	r cNScC
r otaly7 c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - RPP	S8=	r cNScC

Client Sample ID: 160840

Date CollecteW 9106d0 44:1N

Date 5eceiReW 91d8d0 9v:12

Lab Sample ID: 81931209031

- atriM x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepereW or PnalTueW	PnalTAat	Lab
r otaly7 c	j tEB	j kcS j tEB			PE - J N	PERR J N	P6- 21.	- 0yPLYP1 - 1:61	CC5	r cNScC
r otaly7 c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - R2-	S8=	r cNScC

Client Sample ID: 22818v

Date CollecteW 9106d0 4/ :1v

Date 5eceiReW 91d8d0 9v:12

Lab Sample ID: 81931209038

- atriM x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepereW or PnalTueW	PnalTAat	Lab
r otaly7 c	j tEB	j kcS j tEB			PE - J N	PERR J N	P6- 21.	- 0yPLYP1 - 1:61	CC5	r cNScC
r otaly7 c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - RL-	S8=	r cNScC

Client Sample ID: 16089v

Date CollecteW 9106d0 42:9N

Date 5eceiReW 91d8d0 9v:12

Lab Sample ID: 81931209037

- atriM x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepereW or PnalTueW	PnalTAat	Lab
r otaly7 c	j tEB	j kcS j tEB			PE - J N	PERR J N	P6- 21.	- 0yPLYP1 - 1:61	CC5	r cNScC
r otaly7 c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - 1:- R	S8=	r cNScC

Client Sample ID: 26/ 6N4

Date CollecteW 9100d0 9v:12

Date 5eceiReW 91d8d0 9v:12

Lab Sample ID: 81931209032

- atriM x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepereW or PnalTueW	PnalTAat	Lab
r otaly7 c	j tEB	j kcS j tEB			PE - J N	PERR J N	P6- 21.	- 0yPLYP1 - 1:61	CC5	r cNScC
r otaly7 c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - 1:06	S8=	r cNScC

Client Sample ID: 2/ 988434

Date CollecteW 9100d0 44:/ 9

Date 5eceiReW 91d8d0 9v:12

Lab Sample ID: 81931209036

- atriM x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepereW or PnalTueW	PnalTAat	Lab
r otaly7 c	j tEB	j kcS j tEB			PE - J N	PERR J N	P6- 21.	- 0yPLYP1 - 1:61	CC5	r cNScC
r otaly7 c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - 1:L2	S8=	r cNScC

restcJ ebina SantaJ ento

Lab Chronicle

Client: Shannon & Wilson
 Site: City of Kansas City, MO

Reference: 20-4061-14

Client Sample ID: 169N82

Date Collected: 9/10/2018 4:28:12

Date Received: 9/10/2018 9:12

Lab Sample ID: 8193120903

- atrim x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepW or PnalTueW	PnalTAt	Lab
rotaly c	j bEB	j kcS j bEB			PE - J N	PER J N	P6- 21.	- 0yPLyP1 - 1:61	CC5	r cNScC
rotaly c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - . : 0	S8=	r cNScC

Client Sample ID: 622v22

Date Collected: 9/10/2018 4:48:47

Date Received: 9/10/2018 9:12

Lab Sample ID: 8193120903

- atrim x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepW or PnalTueW	PnalTAt	Lab
rotaly c	j bEB	j kcS j bEB			PE - J N	PER J N	P6- 21.	- 0yPLyP1 - 1:61	CC5	r cNScC
rotaly c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - . : 2.	S8=	r cNScC

Client Sample ID: 1609/ 9

Date Collected: 9/10/2018 4:47:44

Date Received: 9/10/2018 9:12

Lab Sample ID: 8193120903

- atrim x ater

Brep 7Tpe	yatch 7Tpe	yatch - ethoW	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepW or PnalTueW	PnalTAt	Lab
rotaly c	j bEB	j kcS j bEB			PE - J N	PER J N	P6- 21.	- 0yPLyP1 - 1:61	CC5	r cNScC
rotaly c	cnalf sis	j kcS		P			P6- R62	- 0yP6yP1 - . : 61	S8=	r cNScC

Laboratory Reference:

r cNScC, r estcJ ebina SantaJ entoT. . - ivebside j atgwaf TWest SantaJ entoTCc 96R- 6Tr 8N(9PR)2124R -

Reference: 20-4061-14

Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25808-1

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-17-18
Arizona	State Program	9	AZ0807	07-11-18
Arkansas DEQ	State Program	6	77-0691	06-18-18
California	State Program	9	2798	01-31-17
Colorado	State Program	7	CA00044	07-31-18
Connecticut	State Program	1	PH-0691	06-30-18
Florida	NELAP	4	E78580	06-30-18
Hawaii	State Program	9	N/A	01-31-18 *
Illinois	NELAP	5	200060	03-18-17
Kansas	NELAP	8	E-10385	10-31-18
L-A-B	DoD ELAP		L2467	01-20-17
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-17-17
Michigan	State Program	5	9948	01-31-17
Nevada	State Program	9	CA00044	08-31-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-27-17
Pennsylvania	NELAP	3	67-01282	03-31-18
Texas	NELAP	6	T104804399	08-31-18
US Fish & Wildlife	Federal		LE147377-0	10-31-18
USDA	Federal		P330-11-00436	12-30-18
USEPA UCMR	Federal	1	CA00044	11-06-17
Utah	NELAP	7	CA00044	02-27-18
Virginia	NELAP	3	460287	03-14-18
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	7	7TMS-L	01-29-18 *

* Certification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Method	Method Description	Protocol	Laboratory
PFAS	Perfluorinated Alkyl Substances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25707-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-25707-1	266311	Water	02/06/17 10:43	02/13/17 09:25
320-25707-2	267317	Water	02/06/17 11:28	02/13/17 09:25
320-25707-3	553239	Water	02/06/17 14:29	02/13/17 09:25
320-25707-4	267309	Water	02/06/17 15:08	02/13/17 09:25
320-25707-5	564681	Water	02/07/17 09:25	02/13/17 09:25
320-25707-6	540331-1	Water	02/07/17 11:40	02/13/17 09:25
320-25707-7	260835	Water	02/07/17 15:30	02/13/17 09:25
320-25707-8	655955	Water	02/08/17 13:14	02/13/17 09:25
320-25707-9	267040	Water	02/08/17 14:18	02/13/17 09:25



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Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Page 1 of 1
Laboratory Test America
Attn: David Altucker

Analysis Parameters/Sample Container Description
(include preservative if used)

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: 31-1-11735-009	Total Number of Containers 18	Signature: [Signature]	Time: 12:15	Signature: _____	Time: _____	Signature: _____	Time: _____	Signature: _____	Time: _____
Project Name: CoF Fire To CoA	COC Seals/Intact? Y/N/NA	Printed Name: _____	Date: 2/9/17	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Contact: MDN	Received Good Cond./Cold	Company: _____		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: Fed Ex								
Sampler: SMH	(attach shipping bill, if any)								
Instructions		Received By: 1.		Received By: 2.		Received By: 3.			
Requested Turnaround Time: Standard		Signature: [Signature]	Time: 0125	Signature: _____	Time: _____	Signature: _____	Time: _____		
Special Instructions: Bill to: 31-1-11735-009		Printed Name: _____	Date: 2/13/17	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____		
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File		Company: [Signature]	1330	Company: _____		Company: _____			

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

No. 34297

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-25707-1

Login Number: 25707

List Number: 1

Creator: Turpen, Troy

List Source: TestAmerica Sacramento

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

Laboratory Data Review Checklist

Completed by: Marcy Nadel

Title: Geologist Date: February 22, 2017

CS Report Name: City of Fairbanks Fire Training Area Report Date: February 22, 2017

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-25707-1

ADEC File Number: 102.38.182 ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 ☒ NA (Please explain.) Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The name for sample 540323-1 (listed on COC) was changed to 540331-1 (listed in report) following receipt by the laboratory.

- b. Correct analyses requested?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?

☐ Yes ☒ No ☐ NA (Please explain.)

Comments:

The temperature blank was measured outside the acceptable temperature range of 0°C to 6°C upon receipt at the laboratory (13.3°C). The laboratory receipt documentation notes that the shipment was delayed in transit; melted gel packs were observed resting over the bag of samples. Due to the high chemical and biological stability of PFCs, it is unlikely the integrity of the project samples was adversely affected by the high cooler temperature. In an e-mail dated August 3, 2015, the ADEC project manager noted that he had spoken with their chemist, who "agrees the high temperature probably would not affect the PFC results."

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Analysis of PFCs does not require a preservative.

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The laboratory noted that the temperature of the cooler at receipt was 13.3°C .

The client (Shannon & Wilson) requested a sample ID be changed from 540323-1 to 540331-1.

There was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) to assess laboratory accuracy and precision.

- c. Were all corrective actions documented?
☒Yes ☐No ☐NA (Please explain.)

Comments:

Laboratory control sample (LCS) and LCS duplicate (LCSD) were analyzed to assess laboratory accuracy and precision.

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

Comments:

The laboratory did not specify any effect on data quality or usability.

5. Samples Results

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

- b. All applicable holding times met?

☒Yes ☐No ☐NA (Please explain.)

Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

- c. All soils reported on a dry weight basis?

☐Yes ☐No ☒NA (Please explain.)

Comments:

Soil samples were not submitted with this work order.

- d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒Yes ☐No ☐NA (Please explain.)

Comments:

The PQL, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC-proposed groundwater cleanup levels for PFOS and PFOA.

- e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

- a. Method Blank

- i. One method blank reported per matrix, analysis and 20 samples?

☒Yes ☐No ☐NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Comments:

PFCs were not detected in MB 320-150378/1-A.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were 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 ☐ NA (Please explain.)

Comments:

LCS/LCSD sample results were reported.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries were within the ranges required by the laboratory method.

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 ☐ NA (Please explain.)

Comments:

The RPDs were within the laboratory limit.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries for surrogates are within the laboratory limits.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

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 ☒ NA (Please explain.)

Comments:

PFCs are not volatile compounds; a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC?
(If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required; see above.

- iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required.

- iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required.

- v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☐ Yes ☒ No ☐ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO; however, field duplicates are submitted at the appropriate frequency for the overall project.

- ii. Submitted blind to lab?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO.

- 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 ☒ NA (Please explain.) Comments:

A field-duplicate pair was not submitted with this WO.

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

Comments:

The data quality and usability were not affected; see above.

- f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Reusable equipment was not utilized during sample collection for this WO; an equipment blank is not required.

- i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

An equipment blank was not submitted with this WO.

- ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

There were no other data qualifiers used.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-25710-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

2/22/2017 12:53:12 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25710-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25710-1

Job ID: 320-25710-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-25710-1

Receipt

The sample was received on 2/13/2017 9:25 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 13.3° C.

Receipt Exceptions

The following sample was received at the laboratory outside the required temperature criteria: 407429 (320-25710-1). The cooling media, 2 gel packs, were thawed. The client was contacted and the lab instructed to proceed.

LCMS

Method(s) PFAS: The samples were analyzed by the direct injection method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.2 "Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissue":

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-150678.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25710-1

Client Sample ID: 407429

Lab Sample ID: 320-25710-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	28		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	68		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25710-1

Client Sample ID: 407429

Date Collected: 02/06/17 13:39

Date Received: 02/13/17 09:25

Lab Sample ID: 320-25710-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	28		2.0	0.75	ng/L		02/15/17 13:14	02/15/17 17:26	1
Perfluorooctanesulfonic acid (PFOS)	68		2.0	1.3	ng/L		02/15/17 13:14	02/15/17 17:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	110		25 - 150				02/15/17 13:14	02/15/17 17:26	1
13C4 PFOS	108		25 - 150				02/15/17 13:14	02/15/17 17:26	1

TestAmerica Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25810-1

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	3C4 PFO ₃ (25-150)	3C4 PFO ₃ (25-150)
320-25810-1	408427	110	106
LCS 320-150986/2-A	Lab Control Sample	102	109
LCSD 320-150986/3-A	Lab Control Sample Dup	106	112
MB 320-150986/1-A	Method Blank	102	105
Surrogate Legend			
13C4 PFOA = 13C4 PFOA			
13C4 PFOS = 13C4 PFOS			

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25710-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-15078/ x1-A
MatriW T ater
Analysis Batch: 150853

Client Sample ID: Method Blank
Prep Nype: Notal6 A
Prep Batch: 15078/

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		02/15/17 13:14	02/15/17 16:31	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		02/15/17 13:14	02/15/17 16:31	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	102		25 - 150				02/15/17 13:14	02/15/17 16:31	1
13C4 PFOS	105		25 - 150				02/15/17 13:14	02/15/17 16:31	1

Lab Sample ID: LCS 320-15078/ x2-A
MatriW T ater
Analysis Batch: 150853

Client Sample ID: Lab Control Sample
Prep Nype: Notal6 A
Prep Batch: 15078/
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	19.4		ng/L		97	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	17.7		ng/L		96	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	102		25 - 150				
13C4 PFOS	105		25 - 150				

Lab Sample ID: LCSD 320-15078/ x3-A
MatriW T ater
Analysis Batch: 150853

Client Sample ID: Lab Control Sample Dup
Prep Nype: Notal6 A
Prep Batch: 15078/
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	18.8		ng/L		94	63 - 141	3	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.6		ng/L		95	47 - 162	1	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	108		25 - 150						
13C4 PFOS	112		25 - 150						

TestAmerica Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25710-1

LCMS

Prep Batch: 150378

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25710-1	407429	Total/NA	Water	PFAS Prep	
MB 320-150678/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-150678/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-150678/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 150756

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25710-1	407429	Total/NA	Water	PFAS	150678
MB 320-150678/1-A	Method Blank	Total/NA	Water	PFAS	150678
LCS 320-150678/2-A	Lab Control Sample	Total/NA	Water	PFAS	150678
LCSD 320-150678/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	150678

Lab Chronicle

Client: Shannon & Wilson
 Site: City of Kansas City, MO

Project: 20-061P-4

Client Sample ID: 407429
Date Collected: 02/06/17 13:39
Date Received: 02/13/17 09:25

Lab Sample ID: 320-25710-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
rotaryEc	jetB	jetB			PR- J N	PR- J N	P6- 17	- 0yP6yP1 P2:PL	CC5	rcNScC
rotaryEc	cnalf sis	jetB		P			P6- 162	- 0yP6yP1 P1:0.	S8=	rcNScC

Laboratory References:

rcNScC, Project: 20-061P-4, Santa J entoT77- =ivebside j atgwaf TWest Santa J entoTCc 96. - 6Tr 8N(9P.)21246. --

Project: 20-061P-4, Santa J ento

Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25810-1

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-17-18
Arizona	State Program	9	AZ0807	07-11-18
Arkansas DEQ	State Program	6	77-0691	06-18-18
California	State Program	9	2798	01-31-17
Colorado	State Program	7	CA00044	07-31-18
Connecticut	State Program	1	PH-0691	06-30-18
Florida	NELAP	4	E78580	06-30-18
Hawaii	State Program	9	N/A	01-31-18 *
Illinois	NELAP	5	200060	03-18-17
Kansas	NELAP	8	E-10385	10-31-18
L-A-B	DoD ELAP		L2467	01-20-17
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-17-17
Michigan	State Program	5	9948	01-31-17
Nevada	State Program	9	CA00044	08-31-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-27-17
Pennsylvania	NELAP	3	67-01282	03-31-18
Texas	NELAP	6	T104804399	08-31-18
US Fish & Wildlife	Federal		LE147377-0	10-31-18
USDA	Federal		P330-11-00436	12-30-18
USEPA UCMR	Federal	1	CA00044	11-06-17
Utah	NELAP	7	CA00044	02-27-18
Virginia	NELAP	3	460287	03-14-18
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	7	7TMS-L	01-29-18 *

* Certification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25710-1

Method	Method Description	Protocol	Laboratory
PFAS	Perfluorinated Alkyl Substances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

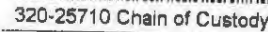
TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25710-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-25710-1	407429	Water	02/06/17 13:39	02/13/17 09:25



2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test America
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735-008</u>		Total Number of Containers: <u>2</u>		Signature: <u>Sharon H. Lee</u> Time: <u>12:15</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>CoF Reg File Tr</u>		COC Seals/Intact? Y/N/NA		Printed Name: _____ Date: <u>2/9/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN</u>		Received Good Cond./Cold		Company: <u>Sharon Wilson, Inc.</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>Fed Ex</u>		Received By: 1. Signature: <u>Tim J. [Signature]</u> Time: <u>09:25</u>		Received By: 2. Signature: _____ Time: _____		Received By: 3. Signature: _____ Time: _____	
Sampler: <u>3MH</u>		(attach shipping bill, if any)		Printed Name: <u>Troy & Thompson</u> Date: <u>2/13/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: <u>Standard</u>				Signature: _____ Time: _____		Signature: _____ Time: _____		Signature: _____ Time: _____	
Special Instructions: <u>Bill to: 31-1-11735-008</u>				Company: <u>TAW</u>		Company: _____		Company: _____	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File				13.30C gel red					

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

No. 34298

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-25710-1

Login Number: 25710

List Number: 1

Creator: Turpen, Troy

List Source: TestAmerica Sacramento

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

Laboratory Data Review Checklist

Completed by:

Title: Date:

CS Report Name: Report Date:

Consultant Firm:

Laboratory Name: Laboratory Report Number:

ADEC File Number: ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 ☒ NA (Please explain.) Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

- b. Correct analyses requested?
☒ Yes ☐ No ☐ NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?

☐ Yes ☒ No ☐ NA (Please explain.)

Comments:

The temperature blank was measured outside the acceptable temperature range of 0°C to 6°C upon receipt at the laboratory (13.3°C). The laboratory receipt documentation notes that the shipment was delayed in transit; melted gel packs were observed resting over the bag of samples.

Due to the high chemical and biological stability of PFCs, it is unlikely the integrity of the project samples was adversely affected by the high cooler temperature. Analysis of PFCs does not require a preservative. In an e-mail dated August 3, 2015, the ADEC project manager noted that he had spoken with their chemist, who "agrees the high temperature probably would not affect the PFC results."

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Analysis of PFCs does not require a preservative.

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- e. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The laboratory noted the temperature of the cooler at receipt was 13.3°C .

There was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) to assess laboratory accuracy and precision.

- c. Were all corrective actions documented?
☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

A laboratory control sample (LCS) and LCS duplicate (LCSD) were extracted with this batch to demonstrate laboratory accuracy and precision.

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

Comments:

The laboratory did not specify any effect on data quality or usability.

5. Samples Results

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

- b. All applicable holding times met?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

- c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Soil samples were not submitted with this work order.

- d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The PQL, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

- e. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

6. QC Samples

- a. Method Blank

- i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Comments:

PFCs were not detected in MB 320-150678/1-A.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were 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 ☐ NA (Please explain.)

Comments:

LCS/LCSD sample results were reported.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries were within the ranges required by the laboratory method.

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 ☐ NA (Please explain.)

Comments:

The RPDs were within the laboratory limit.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Percent recoveries for surrogates are within the laboratory limits.

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

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

Qualification of the results was not required; see above.

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

Comments:

The data quality and usability were not affected.

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 ☒ NA (Please explain.)

Comments:

PFCs are not volatile compounds; a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC?
(If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required; see above.

- iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required.

- iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required.

- v. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☐ Yes ☒ No ☐ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO; however, field duplicates are submitted at the appropriate frequency for the overall project.

- ii. Submitted blind to lab?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A field-duplicate pair was not submitted with this WO.

- 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 ☒ NA (Please explain.) Comments:

A field-duplicate pair was not submitted with this WO.

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

Comments:

The data quality and usability were not affected; see above.

- f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

Reusable equipment was not utilized during sample collection for this WO; an equipment blank is not required.

- i. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

An equipment blank was not submitted with this WO.

- ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected? (Please explain.)

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

There were no other data qualifiers used.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-27373-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

4/20/2017 9:13:00 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

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results through

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Have a Question?



Visit us at:

www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Job ID: 320-26363-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-26363-1

Receipt

The samples were received on 4/11/2017 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.3° C.

LCMS

Method(s) PFAS: The samples were analyzed by the direct injection method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.2 "Per- and Polyfluorinated Substances (PFAS) in Water, Soils, Sediments and Tissue":

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-159898.

Method(s) PFAS Prep: Orange color, light sediment present. 168980 (320-27373-1), 87301 (320-27373-2), 167754 (320-27373-3), 168688 (320-27373-4), 169199 (320-27373-5), 169099 (320-27373-6), 168173 (320-27373-7), 407411 (320-27373-8), 92924 (320-27373-9), 515493-2 (320-27373-10), 87408 (320-27373-12), 168386 (320-27373-13), 515485 (320-27373-14), 169048 (320-27373-15), 168726 (320-27373-16), 87435 (320-27373-17) and 87335 (320-27373-18)

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 168980

Lab Sample ID: 320-27373-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	16		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 87301

Lab Sample ID: 320-27373-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	4.2		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	28		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 167754

Lab Sample ID: 320-27373-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	12		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	56		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168688

Lab Sample ID: 320-27373-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.8		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.3		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 169199

Lab Sample ID: 320-27373-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	94		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 169099

Lab Sample ID: 320-27373-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	93		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168173

Lab Sample ID: 320-27373-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	24		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 407411

Lab Sample ID: 320-27373-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	23		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	42		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 92924

Lab Sample ID: 320-27373-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	5.7		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	36		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 515493-2

Lab Sample ID: 320-27373-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	19		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	37		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168378

Lab Sample ID: 320-27373-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	5.6		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	29		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 87408

Lab Sample ID: 320-27373-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	6.4		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	37		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168386

Lab Sample ID: 320-27373-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	5.4		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	39		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 515485

Lab Sample ID: 320-27373-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	8.2		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	29		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 169048

Lab Sample ID: 320-27373-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	23		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168726

Lab Sample ID: 320-27373-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	6.2		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	51		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 87435

Lab Sample ID: 320-27373-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	13		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 87335

Lab Sample ID: 320-27373-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	4.0		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	13		2.0	1.3	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 176860

Date Collected: 04/03/17 13:00

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-1

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	27		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 10:27	1
Perfluorooctanesulfonic Acid (PFOS)	17		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 10:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	125		5- 01- 2				24/17/17 28:- 7	24/19/17 12:57	1
13C4 PFOS	121		5- 01- 2				24/17/17 28:- 7	24/19/17 12:57	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 65301

Date Collected: 04/03/17 11:08

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-2

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	22		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 10:46	1
Perfluorooctanesulfonic Acid (PFOS)	26		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 10:46	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	123		5- 01- 2				24/17/17 28:- 7	24/19/17 12:46	1
13C4 PFOS	126		5- 01- 2				24/17/17 28:- 7	24/19/17 12:46	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 1755vc

Date Collected: 0cd03d15 10:v6

Date Received: 0cd1d15 08:cv

Lab Sample ID: 320-25353-3

4 at 9M r ate9

4 ethxo: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	12		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 11:04	1
Perfluorooctanesulfonic Acid (PFOS)	7		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 11:04	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	124		5- 01- 2				24/17/17 28:- 7	24/19/17 11:24	1
13C4 PFOS	88		5- 01- 2				24/17/17 28:- 7	24/19/17 11:24	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 176766

Date Collected: 04/03/15 11:23

Date Received: 04/14/15 08:00

Lab Sample ID: 320-25353-c

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	3.6		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 11:41	1
Perfluorooctanesulfonic Acid (PFOS)	3.3		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 11:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	122		5- 01- 2				24/17/17 28:- 7	24/19/17 11:41	1
13C4 PFOS	88		5- 01- 2				24/17/17 28:- 7	24/19/17 11:41	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 178188

Date Collected: 04/03/15 11:20

Date Received: 04/14/15 08:00

Lab Sample ID: 320-25353-v

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	8	c	2.0	0.75	ng/L		04/17/17 09:57	04/18/17 11:59	1
Perfluorooctanesulfonic Acid (PFOS)	110		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 11:59	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	125		5- 01- 2				24/17/17 28:- 7	24/19/17 11:- 8	1
13C4 PFOS	123		5- 01- 2				24/17/17 28:- 7	24/19/17 11:- 8	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 178088

Date Collected: 04/03/15 1v:1v

Date Received: 04/14/15 08:cv

Lab Sample ID: 320-25353-7

4 at 9M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	83		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 12:17	1
Perfluorooctanesulfonic Acid (PFOS)	110		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 12:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	123		5- 01- 2				24/17/17 28:- 7	24/19/17 15:17	1
13C4 PFOS	125		5- 01- 2				24/17/17 28:- 7	24/19/17 15:17	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 176153

Date Collected: 04/03/17 17:00

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-5

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	2.5		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 12:36	1
Perfluorooctanesulfonic Acid (PFOS)	2.0		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 12:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	12-		5- 01- 2				24/17/17 28:- 7	24/19/17 15:36	1
13C4 PFOS	89		5- 01- 2				24/17/17 28:- 7	24/19/17 15:36	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: c05c11

Date Collected: 04/05/17 12:17

Date Received: 04/11/17 08:08

Lab Sample ID: 320-25353-6

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	23		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 12:54	1
Perfluorooctanesulfonic Acid (PFOS)	c2		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 12:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	88		5- 01- 2				24/17/17 28:- 7	24/19/17 15:- 4	1
13C4 PFOS	86		5- 01- 2				24/17/17 28:- 7	24/19/17 15:- 4	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 8282c

Date Collected: 04/05/17 10:50:00

Date Received: 04/11/17 08:00:00

Lab Sample ID: 320-25353-8

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	25		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 13:13	1
Perfluorooctanesulfonic Acid (PFOS)	37		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 13:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	88		5- 01- 2				24/17/17 28:- 7	24/19/17 13:13	1
13C4 PFOS	89		5- 01- 2				24/17/17 28:- 7	24/19/17 13:13	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: v1vc83-2

Date Collected: 04/05/17 13:33

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-10

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	18		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 13:31	1
Perfluorooctanesulfonic Acid (PFOS)	35		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 13:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	122		5- 01- 2				24/17/17 28:- 7	24/19/17 13:31	1
13C4 PFOS	89		5- 01- 2				24/17/17 28:- 7	24/19/17 13:31	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 176356

Date Collected: 04/05/17 15:06

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-11

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	27		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 13:49	1
Perfluorooctanesulfonic Acid (PFOS)	28		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 13:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	125		5- 01- 2				24/17/17 28:- 7	24/19/17 13:48	1
13C4 PFOS	88		5- 01- 2				24/17/17 28:- 7	24/19/17 13:48	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 65c06

Date Collected: 04/05/17 17:37

Date Received: 04/11/17 08:08

Lab Sample ID: 320-25353-12

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	7.2		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 14:08	1
Perfluorooctanesulfonic Acid (PFOS)	35		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 14:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	121		5- 01- 2				24/17/17 28:- 7	24/19/17 14:29	1
13C4 PFOS	89		5- 01- 2				24/17/17 28:- 7	24/19/17 14:29	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 176367

Date Collected: 04/05/17 11:33

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-13

4 at 9M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	38		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 14:26	1
Perfluorooctanesulfonic Acid (PFOS)	38		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 14:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	125		5- 01- 2				24/17/17 28:- 7	24/19/17 14:56	1
13C4 PFOS	87		5- 01- 2				24/17/17 28:- 7	24/19/17 14:56	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: v1vc6v

Date Collected: 04/05/17 15:37

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-1c

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	62		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 15:03	1
Perfluorooctanesulfonic Acid (PFOS)	28		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 15:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	125		5- 01- 2				24/17/17 28:- 7	24/19/17 1- :23	1
13C4 PFOS	125		5- 01- 2				24/17/17 28:- 7	24/19/17 1- :23	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 1780c6

Date Collected: 04/05/17 12:00

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-1v

4 at 9M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	30		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 15:21	1
Perfluorooctanesulfonic Acid (PFOS)	23		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 15:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	124		5- 01- 2				24/17/17 28:- 7	24/19/17 1:- :51	1
13C4 PFOS	125		5- 01- 2				24/17/17 28:- 7	24/19/17 1:- :51	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 176527

Date Collected: 04/05/17 10:30

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-17

4 at 9M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	72		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 15:40	1
Perfluorooctanesulfonic Acid (PFOS)	v1		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 15:40	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	124		5- 01- 2				24/17/17 28:- 7	24/19/17 1- :42	1
13C4 PFOS	122		5- 01- 2				24/17/17 28:- 7	24/19/17 1- :42	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 65c3v

Date Collected: 04/05/17 17:00

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-15

4 at 91M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	3.8		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 15:58	1
Perfluorooctanesulfonic Acid (PFOS)	13		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 15:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	121		5- 01- 2				24/17/17 28:- 7	24/19/17 1:- 9	1
13C4 PFOS	89		5- 01- 2				24/17/17 28:- 7	24/19/17 1:- 9	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Client Sample ID: 6533v

Date Collected: 04/05/17 15:13

Date Received: 04/11/17 08:00

Lab Sample ID: 320-25353-16

4 at 9M rate

4 ethox: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic Acid (PFOA)	20		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 16:16	1
Perfluorooctanesulfonic Acid (PFOS)	13		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 16:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	89		5- 01- 2				24/17/17 28:- 7	24/19/17 16:16	1
13C4 PFOS	84		5- 01- 2				24/17/17 28:- 7	24/19/17 16:16	1

TestAmerica Sacramento

Isotope Dilution Summary

100% of the total sample is analyzed.
 , reagent: 100% of the total sample is analyzed.

TestAmerica Job ID: 320-25353-8

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	3C4 PFO ₈ (25-150)	3C4 PFO ₉ (25-150)
320-25353-8	8g6460	802	808
320-25353-2	65308	803	80g
320-25353-3	8g5597	807	44
320-25353-7	8g6g66	800	44
320-25353-9	8g4844	802	803
320-25353-g	8g4044	803	802
320-25353-5	8g6853	809	46
320-25353-6	705788	44	4g
320-25353-4	42427	44	46
320-25353-80	989743-2	800	46
320-25353-88	8g6356	802	44
320-25353-82	65706	808	46
320-25353-83	8g636g	802	45
320-25353-87	989769	802	802
320-25353-89	8g4076	807	802
320-25353-8g	8g652g	807	800
320-25353-85	65739	808	46
320-25353-86	65339	46	47
L1 n 320-894646j2-A	Lab 1 of 10	802	44
L1 nD 320-894646j3-A	Lab 1 of 10	808	808
MB 320-894646j8-A	MetSod B&I F	46	47
Surrogate Legend			
8317, f OA = 8317, f OA			
8317, f On = 8317, f On			

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-159898/1-A

Matrix: Water

Analysis Batch: 160184

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 159898

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		04/17/17 09:57	04/18/17 09:32	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		04/17/17 09:57	04/18/17 09:32	1
Isotope Dilution	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	98		25 - 150				04/17/17 09:57	04/18/17 09:32	1
13C4 PFOS	94		25 - 150				04/17/17 09:57	04/18/17 09:32	1

Lab Sample ID: LCS 320-159898/2-A

Matrix: Water

Analysis Batch: 160184

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 159898

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	22.4		ng/L		112	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	21.9		ng/L		118	47 - 162
Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits				
13C4 PFOA	102		25 - 150				
13C4 PFOS	99		25 - 150				

Lab Sample ID: LCSD 320-159898/3-A

Matrix: Water

Analysis Batch: 160184

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 159898

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	23.1		ng/L		115	63 - 141	3	30
Perfluorooctanesulfonic acid (PFOS)	18.6	21.9		ng/L		118	47 - 162	0	30
Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits						
13C4 PFOA	101		25 - 150						
13C4 PFOS	101		25 - 150						

TestAmerica Sacramento

QC Association Summary

100% of the total sample weight is accounted for in the sample weight, reflecting the total weight of the sample.

TestAmerica Job ID: 320-25353-8

LCMS

Prep Batch: 159898

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25353-8	8p6460	Total A	& ater	, f An , reg	
320-25353-2	65308	Total A	& ater	, f An , reg	
320-25353-3	8p55N9	Total A	& ater	, f An , reg	
320-25353-9	8p6p66	Total A	& ater	, f An , reg	
320-25353-N	8p4844	Total A	& ater	, f An , reg	
320-25353-p	8p4044	Total A	& ater	, f An , reg	
320-25353-5	8p6853	Total A	& ater	, f An , reg	
320-25353-6	905988	Total A	& ater	, f An , reg	
320-25353-4	42429	Total A	& ater	, f An , reg	
320-25353-80	N8N943-2	Total A	& ater	, f An , reg	
320-25353-88	8p6356	Total A	& ater	, f An , reg	
320-25353-82	65906	Total A	& ater	, f An , reg	
320-25353-83	8p636p	Total A	& ater	, f An , reg	
320-25353-89	N8N96N	Total A	& ater	, f An , reg	
320-25353-8N	8p4096	Total A	& ater	, f An , reg	
320-25353-8p	8p652p	Total A	& ater	, f An , reg	
320-25353-85	6593N	Total A	& ater	, f An , reg	
320-25353-86	6533N	Total A	& ater	, f An , reg	
MB 320-8N4646j8-A	MetSod B@I F	Total A	& ater	, f An , reg	
L1 n 320-8N4646j2-A	Lab 1 of troQamg@	Total A	& ater	, f An , reg	
L1 nD 320-8N4646j3-A	Lab 1 of troQamg@ Dug	Total A	& ater	, f An , reg	

Analysis Batch: 160184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25353-8	8p6460	Total A	& ater	, f An	8N4646
320-25353-2	65308	Total A	& ater	, f An	8N4646
320-25353-3	8p55N9	Total A	& ater	, f An	8N4646
320-25353-9	8p6p66	Total A	& ater	, f An	8N4646
320-25353-N	8p4844	Total A	& ater	, f An	8N4646
320-25353-p	8p4044	Total A	& ater	, f An	8N4646
320-25353-5	8p6853	Total A	& ater	, f An	8N4646
320-25353-6	905988	Total A	& ater	, f An	8N4646
320-25353-4	42429	Total A	& ater	, f An	8N4646
320-25353-80	N8N943-2	Total A	& ater	, f An	8N4646
320-25353-88	8p6356	Total A	& ater	, f An	8N4646
320-25353-82	65906	Total A	& ater	, f An	8N4646
320-25353-83	8p636p	Total A	& ater	, f An	8N4646
320-25353-89	N8N96N	Total A	& ater	, f An	8N4646
320-25353-8N	8p4096	Total A	& ater	, f An	8N4646
320-25353-8p	8p652p	Total A	& ater	, f An	8N4646
320-25353-85	6593N	Total A	& ater	, f An	8N4646
320-25353-86	6533N	Total A	& ater	, f An	8N4646
MB 320-8N4646j8-A	MetSod B@I F	Total A	& ater	, f An	8N4646
L1 n 320-8N4646j2-A	Lab 1 of troQamg@	Total A	& ater	, f An	8N4646
L1 nD 320-8N4646j3-A	Lab 1 of troQamg@ Dug	Total A	& ater	, f An	8N4646

TestAmerica nacramel to

Lab Chronicle

Client: Shannon & Wilson
 Project/Site: City of Falls Church

Reference: 20-0626241

Client Sample ID: 168489

Date Collected: 9/ 23/ 13

Date Received: 9/ 21/ 14

Lab Sample ID: 32902-3-301

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1N7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 1- :06	S=,	r.c. ScC

Client Sample ID: 8-391

Date Collected: 9/ 23/ 11

Date Received: 9/ 21/ 14

Lab Sample ID: 32902-3-302

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1N7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 1- :58	S=,	r.c. ScC

Client Sample ID: 16- - 7/

Date Collected: 9/ 23/ 19

Date Received: 9/ 21/ 14

Lab Sample ID: 32902-3-303

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1N7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 11- :5	S=,	r.c. ScC

Client Sample ID: 168688

Date Collected: 9/ 23/ 1/ :23

Date Received: 9/ 21/ 14

Lab Sample ID: 32902-3-304

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1N7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 11:51	S=,	r.c. ScC

Client Sample ID: 164144

Date Collected: 9/ 23/ 17

Date Received: 9/ 21/ 14

Lab Sample ID: 32902-3-305

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1N7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 11:N	S=,	r.c. ScC

Client Sample ID: 164944

Date Collected: 9/ 23/ 17

Date Received: 9/ 21/ 14

Lab Sample ID: 32902-3-306

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1N7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 10:16	S=,	r.c. ScC

Reference: Santa J ento

Lab Chronicle

Client: Shannon & Wilson
 Project/Site: City of Fairbanks Fire Training Center

Project ID: 20-40626241

Client Sample ID: 1681-3

Date Collected: 9/5/15 - 16/7

Date Received: 9/5/15 - 94/7

Lab Sample ID: 32902-3-30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 10:28	S=,	r.c. ScC

Client Sample ID: / 9- / 11

Date Collected: 9/5/15 - 12:16

Date Received: 9/5/15 - 94/7

Lab Sample ID: 32902-3-308

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 10:N6	S=,	r.c. ScC

Client Sample ID: 4242/

Date Collected: 9/5/15 - 19:7/

Date Received: 9/5/15 - 94/7

Lab Sample ID: 32902-3-304

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 12:12	S=,	r.c. ScC

Client Sample ID: 717/ 4302

Date Collected: 9/5/15 - 13:33

Date Received: 9/5/15 - 94/7

Lab Sample ID: 32902-3-3019

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 12:21	S=,	r.c. ScC

Client Sample ID: 1683-8

Date Collected: 9/5/15 - 1/ :78

Date Received: 9/5/15 - 94/7

Lab Sample ID: 32902-3-3011

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 12:5L	S=,	r.c. ScC

Client Sample ID: 8- / 98

Date Collected: 9/5/15 - 16:36

Date Received: 9/5/15 - 94/7

Lab Sample ID: 32902-3-3012

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 15:- 7	S=,	r.c. ScC

Project ID: 20-40626241

Lab Chronicle

Client: Shannon & Wilson
 Project/Site: City of Fairbanks Fire Training Center

Project ID: 20-40626241

Client Sample ID: 168386

Date Collected: 9/5/15 - 17:33

Date Received: 9/5/15 - 94:/7

Lab Sample ID: 32902-3-3013

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 15:08	S=,	r.c. ScC

Client Sample ID: 717/ 87

Date Collected: 9/5/15 - 17:36

Date Received: 9/5/15 - 94:/7

Lab Sample ID: 32902-3-301/

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 1N- 2	S=,	r.c. ScC

Client Sample ID: 1649/ 8

Date Collected: 9/5/15 - 12:9/

Date Received: 9/5/15 - 94:/7

Lab Sample ID: 32902-3-3017

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 1N01	S=,	r.c. ScC

Client Sample ID: 168- 26

Date Collected: 9/5/15 - 19:39

Date Received: 9/5/15 - 94:/7

Lab Sample ID: 32902-3-3016

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 1N5-	S=,	r.c. ScC

Client Sample ID: 8- / 37

Date Collected: 9/5/15 - 16:99

Date Received: 9/5/15 - 94:/7

Lab Sample ID: 32902-3-301-

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 1N7	S=,	r.c. ScC

Client Sample ID: 8- 337

Date Collected: 9/5/15 - 17:73

Date Received: 9/5/15 - 94:/7

Lab Sample ID: 32902-3-3018

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
total/Ec	Ptep	PFcS Ptep			1R- J.	1R8 J.	1NL7L7	- 5/16/16 - L:N6	CCB	r.c. ScC
total/Ec	cnalysis	PFcS		1			18- 175	- 5/17/16 18:18	S=,	r.c. ScC

Project ID: 20-40626241

Lab Chronicle

Client: Shannon & WilsonTam
Project/Site: City of Fairbanks Fairbanks Training Center

Project ID: 20-40626241

Laboratory References:

1. ScC v r estcJ elina SantaJ entoT77- , idebsiwe Patk9 ayTWest SantaJ entoTCc LN8- NTr =. (L18)262418--

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Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
 Project Site: City of Airborne Fire Training Area

TestAmerica Job ID: 320-25353-8

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska STU	State 1 program	80	(ST-0)	82-87-85
Arizona	State 1 program	9	AZ0507	07-88-85
Arkansas DEQ	State 1 program	6	77-0698	06-85-85
California	State 1 program	9	2795	08-38-87
Colorado	State 1 program	7	CA00044	07-38-85
Connecticut	State 1 program	8	1H-0698	06-30-85
Florida	. ELA1	4	E75) 50	06-30-85
Hawaii	State 1 program	9	. JA	08-29-87
Illinois	. ELA1	)	200060	03-85-87
* Kansas	. ELA1	5	E-8035)	80-38-85
L-A-K	DoD ELA1		L2467	08-20-87
Louisiana	. ELA1	6	30682	06-30-85
Maine	State 1 program	8	CA0004	04-87-87
Michigan	State 1 program	)	9945	08-38-87
. Minnesota	State 1 program	9	CA00044	05-38-85
. New Hampshire	. ELA1	8	2995	04-87-87
. New Jersey	. ELA1	2	CA00)	06-30-85
. New York	. ELA1	2	88666	04-08-87
Yreka	. ELA1	80	4040	08-27-87
Tennessee/ Indiana	. ELA1	3	67-08252	03-38-87
Texas	. ELA1	6	T804504399	05-38-85
(Fish & Wildlife	Federal		LE847377-0	80-38-85
(SDA	Federal		1330-88-00436	82-30-85
(SE1A (CB x	Federal	8	CA00044	88-06-87
(Utah	. ELA1	7	CA00044	02-27-87
Riverina	. ELA1	3	460257	03-84-87
Washington	State 1 program	80	C) 78	0) -0) -85
West Riverina pDWU	State 1 program	3	9930C	82-38-85
Wyoming	State 1 program	7	7TB S-L	08-29-85 V

Method Summary

1 Cel t: nSal l ol h & iSol Wl c

TestAmerica Job ID: 320-25353-7

, roEctjnite: 1 it/ oyf airbal Fs f ire Trail il k Area

Method	Method Description	Protocol	Laboratory
, f An	, eryCoril ateu AG/ ChLbstal ces	TAg-nA1	TAg nA1

Protocol References:

TAg-nA1 d TestAmerica gaboratoriesV& est nacramel toW aciQ/ ntaI uaru = Ceratil k , roceuLrep

Laboratory References:

TAg nA1 d TestAmerica nacramel toW . 0 8 iPersiue , arFv a/ V& est nacramel toW A w9609WTEg (w76)353-9600

TestAmerica nacramel to

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27373-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-27373-1	168980	Water	04/03/17 13:40	04/11/17 09:45
320-27373-2	87301	Water	04/03/17 11:49	04/11/17 09:45
320-27373-3	167754	Water	04/03/17 10:58	04/11/17 09:45
320-27373-4	168688	Water	04/03/17 14:23	04/11/17 09:45
320-27373-5	169199	Water	04/03/17 15:20	04/11/17 09:45
320-27373-6	169099	Water	04/03/17 15:15	04/11/17 09:45
320-27373-7	168173	Water	04/03/17 16:45	04/11/17 09:45
320-27373-8	407411	Water	04/04/17 12:16	04/11/17 09:45
320-27373-9	92924	Water	04/04/17 10:54	04/11/17 09:45
320-27373-10	515493-2	Water	04/04/17 13:33	04/11/17 09:45
320-27373-11	168378	Water	04/04/17 14:58	04/11/17 09:45
320-27373-12	87408	Water	04/04/17 16:36	04/11/17 09:45
320-27373-13	168386	Water	04/04/17 15:33	04/11/17 09:45
320-27373-14	515485	Water	04/05/17 15:36	04/11/17 09:45
320-27373-15	169048	Water	04/05/17 12:04	04/11/17 09:45
320-27373-16	168726	Water	04/05/17 10:30	04/11/17 09:45
320-27373-17	87435	Water	04/05/17 16:00	04/11/17 09:45
320-27373-18	87335	Water	04/05/17 15:53	04/11/17 09:45

CHAIN-OF-CUSTODY RECORD

Page 1 of 2
Laboratory: Test America
Attn: David Allacker

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp	Grab	PFOS + PFDA (WS-LC-0025)						Total Number of Containers	Remarks/Matrix
168980		1340	4/3/17		✓	✓						2	groundwater
87301		1149	↓		✓	✓						2	
167754		1058			✓	✓						2	
168688		1423			✓	✓						2	
169199		1520			✓	✓						2	
169099		1515			✓	✓						2	
168173		1645	↓		✓	✓						2	
407411		1216	4/4/17		✓	✓						2	
92924		1054	↓		✓	✓						2	
515493-2		1333	↓		✓	✓						2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735</u>		Total Number of Containers: <u>34</u>		Signature: <u>Craig Beebe</u> Time: <u>9:25</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>C&F Reg. Tr. Cont.</u>		COC Seals/Intact? Y/N/NA: <u>—</u>		Printed Name: <u>Craig Beebe</u> Date: <u>4/10/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN</u>		Received Good Cond./Cold: <u>—</u>		Company: <u>Shannon & Wilson, Inc.</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>FedEx</u>		Received By: <u>1.</u>		Received By: <u>2.</u>		Received By: <u>3.</u>	
Sampler: <u>CAB/MDN</u>		(attach shipping bill, if any)		Signature: <u>Connor Redman</u> Time: <u>4:00 PM</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Instructions				Printed Name: <u>Connor Redman</u> Date: <u>4/11/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Requested Turnaround Time: <u>Standard</u>				Company: <u>TAWS</u>		Company: _____		Company: _____	
Special Instructions: <u>Please bill to 1735-008</u>									

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File



320-27373 Chain of Custody

No. 34361

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

CHAIN-OF-CUSTODY RECORD

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Page 2 of 2
Laboratory Test America
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp. Grab	Analysis Parameters/Sample Container Description	Total Number of Containers	Remarks/Matrix
168378		1458	4/4/17	✓	PFOS + PFCA WS-LL-0025	2	G-roundwater
87408		1636	↓	✓		2	
168386		1533	↓	✓		2	
515485		1536	4/5/17	✓		2	
169048		1204	↓	✓		2	
168726		1030	↓	✓		2	
87435		1600	↓	✓		2	
87335		1553	↓	✓		2	
				✓ (CAB)			
				✓ (CAB)			

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number:		Total Number of Containers		Signature: <u>Craig Beebe</u> Time: <u>9:25</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>See</u>		COC Seals/Intact? Y/N/NA		Printed Name: <u>Craig Beebe</u> Date: <u>4/6/2017</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>See</u>		Received Good Cond./Cold		Company: <u>Shannon & Wilson, Inc</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>Package</u>							
Sampler: _____		Attach shipping bill, if any							
Instructions									
Requested Turnaround Time: <u>1 of 2</u>									
Special Instructions: _____									
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File									
Received By: 1.		Received By: 2.		Received By: 3.					
Signature: <u>Connor Edman</u> Time: <u>09:45</u>		Signature: _____ Time: _____		Signature: _____ Time: _____					
Printed Name: <u>Connor Edman</u> Date: <u>4/11/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____					
Company: <u>SAWS</u>		Company: _____		Company: _____					

No. 34357

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-27373-1

Login Number: 27373

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

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

Laboratory Data Review Checklist

Completed by:	Adam Wyborny
Title:	Environmental Engineering Staff
Date:	April 20, 2017
CS Report Name:	City of Fairbanks Fire Training Area
Report Date:	April 20, 2017
Consultant Firm:	Shannon & Wilson, Inc.
Laboratory Name:	TestAmerica Laboratories, Inc.
Laboratory Report Number:	320-27373-1
ADEC File Number:	102.38.182
ADEC RecKey Number:	

1. Laboratory

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

☐ Yes ☒ No Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☐ Yes ☒ No Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes ☐ No Comments:

The COC did not clearly identify that PFOS and PFOA analysis was requested for samples 168378, 87408, 168386, 515485, 169048, 168726, 87435, and 87335. However, the laboratory analyzed the samples by the required methods and for the required analytes. The results are not affected by this omission.

b. Correct analyses requested?

☒ Yes ☐ No

Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?

☒ Yes ☐ No

Comments:

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No

Comments:

Other than temperature control, no preservative is required for the analysis of PFCs.

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

☒ Yes ☐ No

Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☐ Yes ☒ No

Comments:

There were no discrepancies documented by the laboratory.

e. Data quality or usability affected? Explain.

Comments:

The data quality and usability were unaffected.

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No

Comments:

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

☒ Yes ☐ No

Comments:

The laboratory noted that there was insufficient volume available to perform a matrix spike/matrix spike duplicate (MS/MSD) on samples associated with preparation batch 320-159898.

The laboratory noted an orange color and the presence of sediment in samples 168980, 87301, 167754, 168688, 169199, 169099, 168173, 407411, 92924, 515493-2, 87408, 168386, 515485, 169048, 168726, 87435, and 87335.

c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

Corrective actions were not required.

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

Comments:

The laboratory did not specify any affect 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:

Soil samples were not submitted with this work order.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes

☐ No

Comments:

The TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC-proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were unaffected.

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 PQL?

☒ Yes

☐ No

Comments:

iii. If above PQL, what samples are affected?

Comments:

None; PFOS and PFOA were not detected in the method blank.

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

☒ Yes ☐ No Comments:

Qualification of the data was not required because there were no method blank detections.

v. Data quality or usability affected? Explain.

Comments:

The data quality and usability were unaffected.

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:

Only PFOS and PFOA analyses were requested with 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:

There were no percent recovery or RPD failures associated with this work order.

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

☐ Yes ☒ No Comments:

Qualification of the data was not required because there were no accuracy or precision failures.

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

Comments:

The data quality and usability were unaffected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No

Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No

Comments:

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

☐ Yes ☒ No

Comments:

There were no ¹³C-isotope recovery failures associated with this work order.

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

Comments:

The data quality and usability were unaffected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No

Comments:

Volatile analyses were not requested with this work order so a trip blank was not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☒ No

Comments:

A trip blank was not submitted with this work order.

iii. All results less than PQL?

☐ Yes ☒ No

Comments:

A trip blank was not submitted with this work order.

iv. If above PQL, what samples are affected?

Comments:

A trip blank was not submitted with this work order.

v. Data quality or usability affected? Explain.

Comments:

The data quality and usability were unaffected.

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:

The field-duplicate pairs 169099/169199 and 87335/87435 were submitted with 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:

The RPD values derived from the field-duplicate samples were found to be within the recommended DQOs (30% for water samples) for all analytes.

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

Comments:

The data quality and usability were unaffected.

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

☐ Yes ☐ No ☒ Not Applicable

i. All results less than PQL?

☐ Yes ☒ No Comments:

For this project, samples are not collected with reusable equipment. This effectively mitigates the potential for sample contamination to occur by exposure contaminated sampling tools.

ii. If above PQL, what samples are affected?

Comments:

An equipment blank was not submitted with this work order.

iii. Data quality or usability affected? Explain.

Comments:

The data quality and usability were unaffected.

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

a. Defined and appropriate?

☐ Yes ☒ No Comments:

There were no other data qualifiers deemed necessary by the laboratory or Shannon & Wilson, Inc.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-27604-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

5/3/2017 12:05:37 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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results through

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Job ID: 320-27604-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-27604-1

Receipt

The samples were received on 4/20/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.5° C.

LCMS

Method(s) PFAS: The samples were analyzed by the in-line SPE method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.4 "Per- and Polyfluorinated Substances (PFAS) in Water, Soils, Sediments and Tissue":

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-161219.

Method(s) PFAS Prep: Sediment present. 167801 (320-27604-1), 167901 (320-27604-2), 167983 (320-27604-3), 64751 (320-27604-4) and 87319 (320-27604-6)

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-161246.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 167801

Lab Sample ID: 320-27604-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.7		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	15		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 167901

Lab Sample ID: 320-27604-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.4		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	14		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 167983

Lab Sample ID: 320-27604-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	17		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	31		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 64751

Lab Sample ID: 320-27604-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	25		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	20		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 407429-D

Lab Sample ID: 320-27604-5

No Detections.

Client Sample ID: 87319

Lab Sample ID: 320-27604-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	4.9		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	26		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 669077

Lab Sample ID: 320-27604-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	35		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: MW-507

Lab Sample ID: 320-27604-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	27		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	320		20	13	ng/L	10			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 615806

Date Collected: 07/05/17 07:00:00

Date Received: 07/20/17 07:30:00

Lab Sample ID: 320-25107-6

4 at 91M r ate9

4 etvx: hPFS - he9Aux9nateo F lf kl SubstanVes

F nalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaV
he9Aux9xxWanxiWaVto yhP(FO	3)5		2.0	0.75	ng/L		04/25/17 09:47	04/26/17 07:53	1
he9Aux9xxWanesulAniWaVto yhP(SO	6.		2.0	1.3	ng/L		04/25/17 09:47	04/26/17 07:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	124		5- 01- 2				24/5- /17 28:47	24/59/17 27:- 3	1
13C4 PFOS	121		5- 01- 2				24/5- /17 28:47	24/59/17 27:- 3	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 615/ 06

Date Collected: 07/05/2017

Date Received: 07/20/2017

Lab Sample ID: 320-25107-2

4 at 91M r ate9

4 etvxo: hPFS - he9Aux9nateo F lf kl SubstanVes

F nalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaV
he9Aux9xxWanxiWaVto yhP(FO	3)7		2.0	0.75	ng/L		04/25/17 09:47	04/26/17 08:11	1
he9Aux9xxWanesulAniWaVto yhP(SO	67		2.0	1.3	ng/L		04/25/17 09:47	04/26/17 08:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	111		5- 01- 2				24/5- /17 28:47	24/59/17 26:11	1
13C4 PFOS	127		5- 01- 2				24/5- /17 28:47	24/59/17 26:11	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 615/ 83

Date Collected: 07/05/17 06:67

Date Received: 07/20/17 07:30

Lab Sample ID: 320-25107-3

4 at 91M r ate9

4 etvxo: hPFS - he9Aux9nateo F lf kl SubstanVes

F nalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaV
he9Aux9xxWanxiWaVto yhP(FO	65		2.0	0.75	ng/L		04/25/17 09:47	04/26/17 08:30	1
he9Aux9xxWanesulAniWaVto yhP(SO	36		2.0	1.3	ng/L		04/25/17 09:47	04/26/17 08:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	12-		5- 01- 2				24/5- /17 28:47	24/59/17 26:32	1
13C4 PFOS	12-		5- 01- 2				24/5- /17 28:47	24/59/17 26:32	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 175. 6

Date Collected: 07/05/17 08:30

Date Received: 07/20/17 09:30

Lab Sample ID: 320-25107-7

4 at 91M r ate9

4 etvxo: hPFS - he9Aux9nateo F lf kl SubstanVes

Fnalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaV
he9Aux9xxWanxiWaVto yhP(FO	2.		2.0	0.75	ng/L		04/25/17 09:47	04/26/17 08:48	1
he9Aux9xxWanesulAniWaVto yhP(SO	20		2.0	1.3	ng/L		04/25/17 09:47	04/26/17 08:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	112		5- 01- 2				24/5- /17 28:47	24/59/17 26:46	1
13C4 PFOS	123		5- 01- 2				24/5- /17 28:47	24/59/17 26:46	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 70572/ -D

Date Collected: 07/05/17 06:38

Date Received: 07/20/17 07:30

Lab Sample ID: 320-25107-

4 at 9M rate

4 etvxo: hPFS - he9Aux9nateo F lf kl SubstanVes

Fnalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaV
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		04/25/17 09:47	04/26/17 09:06	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		04/25/17 09:47	04/26/17 09:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	129		5- 01- 2				24/5- /17 28:47	24/59/17 28:29	1
13C4 PFOS	86		5- 01- 2				24/5- /17 28:47	24/59/17 28:29	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 8536/

Date Collected: 07/05/2016 16:17:22

Date Received: 07/20/2016 09:30

Lab Sample ID: 320-25107-1

4 at 91M rate

4 etvxo: hPFS - he9Aux9nateo F If kl SubstanVes

Fnalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaV
he9Aux9xxWanxiWaWo yhP(FO	7)		2.0	0.75	ng/L		04/25/17 09:47	04/26/17 09:25	1
he9Aux9xxWanesulAniWaWo yhP(SO	21		2.0	1.3	ng/L		04/25/17 09:47	04/26/17 09:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	12-		5- 01- 2				24/5- /17 28:47	24/59/17 28:5-	1
13C4 PFOS	125		5- 01- 2				24/5- /17 28:47	24/59/17 28:5-	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 11/ 055

Date Collected: 07/05/2017

Date Received: 07/20/2017 01:30

Lab Sample ID: 320-25107-5

4 at 91M r ate9

4 etvxo: hPFS - he9Aux9nateo F lf kl SubstanVes

F nalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaV
he9Aux9xxWanxiWaWo yhP(FO	3)/		2.0	0.75	ng/L		04/25/17 10:25	04/25/17 18:25	1
he9Aux9xxWanesulAniWaWo yhP(SO	3.		2.0	1.3	ng/L		04/25/17 10:25	04/25/17 18:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	11-		5- 01- 2				24/5- /17 12:5-	24/5- /17 16:5-	1
13C4 PFOS	123		5- 01- 2				24/5- /17 12:5-	24/5- /17 16:5-	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Client Sample ID: 4 r -. 05

Date CxllleWeo: 070805 62:68

Date ReWeideo: 0702065 0/ :30

Lab Sample ID: 320-25107-8

4 at 9IM r ate9

4 etvx0: hPFS - he9Aux9inateo F lf kl SubstanWes

Fnalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaW
he9Aux9xxWanxiWaWo yhP(FO	25		2.0	0.75	ng/L		04/25/17 10:25	04/25/17 18:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	111		5- 01- 2				24/5- /17 12:5-	24/5- /17 16:43	1
13C4 PFOS	122		5- 01- 2				24/5- /17 12:5-	24/5- /17 16:43	1

4 etvx0: hPFS - he9Aux9inateo F lf kl SubstanWes - DL

Fnalkte	Result	QualiAe9	RL	4 DL	Unit	D	h9epa9eo	F nalkzeo	Dil PaW
he9Aux9xxWanesulAniWaWo yhP(SO	320		20	13	ng/L		04/25/17 10:25	05/02/17 02:10	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	126		5- 01- 2				24/5- /17 12:5-	2- /25/17 25:12	12
13C4 PFOS	88		5- 01- 2				24/5- /17 12:5-	2- /25/17 25:12	12

TestAmerica Sacramento

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QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-161219/1-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 161219

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		04/25/17 09:47	04/26/17 02:04	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		04/25/17 09:47	04/26/17 02:04	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	95		25 - 150				04/25/17 09:47	04/26/17 02:04	1
13C4 PFOS	93		25 - 150				04/25/17 09:47	04/26/17 02:04	1

Lab Sample ID: LCS 320-161219/2-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 161219

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	%Rec.
Perfluorooctanoic acid (PFOA)	20.0	22.4		ng/L		112	63 - 141	
Perfluorooctanesulfonic acid (PFOS)	18.6	20.8		ng/L		112	47 - 162	
Isotope Dilution	%Recovery	LCS Qualifier	Limits					
13C4 PFOA	104		25 - 150					
13C4 PFOS	105		25 - 150					

Lab Sample ID: LCSD 320-161219/3-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 161219

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	21.6		ng/L		108	63 - 141	4	30
Perfluorooctanesulfonic acid (PFOS)	18.6	20.3		ng/L		109	47 - 162	3	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	104		25 - 150						
13C4 PFOS	106		25 - 150						

Lab Sample ID: MB 320-161246/1-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 161246

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		04/25/17 10:25	04/25/17 14:26	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		04/25/17 10:25	04/25/17 14:26	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	109		25 - 150				04/25/17 10:25	04/25/17 14:26	1
13C4 PFOS	105		25 - 150				04/25/17 10:25	04/25/17 14:26	1

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-161246/2-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 161246

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	20.0	22.8		ng/L		114	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	21.4		ng/L		115	47 - 162

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFOA	105		25 - 150
13C4 PFOS	103		25 - 150

Lab Sample ID: LCSD 320-161246/3-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 161246

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	22.4		ng/L		112	63 - 141	2	30
Perfluorooctanesulfonic acid (PFOS)	18.6	21.6		ng/L		117	47 - 162	1	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C4 PFOA	109		25 - 150
13C4 PFOS	101		25 - 150

TestAmerica Sacramento

QC Association Summary

LineSt: h&aSSoS W, iisoSPISc
j ro/ectyhite: l itf oFkairbaSgs kire TraiSiSp Area

TestAmerica Job ID: 320-25801-C

LCMS

Prep Batch: 161219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25801-C	C8540C	Totary7 A	, ater	j kAh j re6	
320-25801-2	C85N0C	Totary7 A	, ater	j kAh j re6	
320-25801-3	C85N43	Totary7 A	, ater	j kAh j re6	
320-25801-1	8159C	Totary7 A	, ater	j kAh j re6	
320-25801-9	10512N-D	Totary7 A	, ater	j kAh j re6	
320-25801-8	453CN	Totary7 A	, ater	j kAh j re6	
MB 320-C8C2CNyC-A	Met&od BræSg	Totary7 A	, ater	j kAh j re6	
LI h 320-C8C2CNy2-A	Lab l oStronham6re	Totary7 A	, ater	j kAh j re6	
LI hD 320-C8C2CNy3-A	Lab l oStronham6re Du6	Totary7 A	, ater	j kAh j re6	

Prep Batch: 161246

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25801-5	88ND55	Totary7 A	, ater	j kAh j re6	
320-25801-4 - DL	M, -905	Totary7 A	, ater	j kAh j re6	
320-25801-4	M, -905	Totary7 A	, ater	j kAh j re6	
MB 320-C8C218yC-A	Met&od BræSg	Totary7 A	, ater	j kAh j re6	
LI h 320-C8C218y2-A	Lab l oStronham6re	Totary7 A	, ater	j kAh j re6	
LI hD 320-C8C218y3-A	Lab l oStronham6re Du6	Totary7 A	, ater	j kAh j re6	

Analysis Batch: 161315

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25801-C	C8540C	Totary7 A	, ater	j kAh	C8C2CN
320-25801-2	C85N0C	Totary7 A	, ater	j kAh	C8C2CN
320-25801-3	C85N43	Totary7 A	, ater	j kAh	C8C2CN
320-25801-1	8159C	Totary7 A	, ater	j kAh	C8C2CN
320-25801-9	10512N-D	Totary7 A	, ater	j kAh	C8C2CN
320-25801-8	453CN	Totary7 A	, ater	j kAh	C8C2CN
320-25801-5	88ND55	Totary7 A	, ater	j kAh	C8C218
320-25801-4	M, -905	Totary7 A	, ater	j kAh	C8C218
MB 320-C8C2CNyC-A	Met&od BræSg	Totary7 A	, ater	j kAh	C8C2CN
MB 320-C8C218yC-A	Met&od BræSg	Totary7 A	, ater	j kAh	C8C218
LI h 320-C8C2CNy2-A	Lab l oStronham6re	Totary7 A	, ater	j kAh	C8C2CN
LI h 320-C8C218y2-A	Lab l oStronham6re	Totary7 A	, ater	j kAh	C8C218
LI hD 320-C8C2CNy3-A	Lab l oStronham6re Du6	Totary7 A	, ater	j kAh	C8C2CN
LI hD 320-C8C218y3-A	Lab l oStronham6re Du6	Totary7 A	, ater	j kAh	C8C218

Analysis Batch: 162224

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-25801-4 - DL	M, -905	Totary7 A	, ater	j kAh	C8C218

TestAmerica hacrameSto

Lab Chronicle

Client: Shannon & Wilson
 Site: CitFokgailDamps gibe r baininB cbea

restcJ ebina l oD8 : 20- 4061- P4

Client Sample ID: 168491

Date Collected: 9- /18/18 19:- 1

Date 5 eceiRed: 9- /29/18 9v:39

Lab Sample ID: 32902869- 01

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAat	Lab
r otalfEc	/ be5	/ gcS / be5			j R- J 7	j R1 J 7	j 1j 0j .	- Pf0Nfj 6 - . :P6	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gcS		j			j 1j 2j N	- Pf01fj 6 - 6:N2	S8=	r c7 ScC

Client Sample ID: 168v91

Date Collected: 9- /18/18 19:- N

Date 5 eceiRed: 9- /29/18 9v:39

Lab Sample ID: 32902869- 02

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAat	Lab
r otalfEc	/ be5	/ gcS / be5			j R- J 7	j R1 J 7	j 1j 0j .	- Pf0Nfj 6 - . :P6	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gcS		j			j 1j 2j N	- Pf01fj 6 - . :j	S8=	r c7 ScC

Client Sample ID: 168v43

Date Collected: 9- /18/18 11:1-

Date 5 eceiRed: 9- /29/18 9v:39

Lab Sample ID: 32902869- 03

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAat	Lab
r otalfEc	/ be5	/ gcS / be5			j R- J 7	j R1 J 7	j 1j 0j .	- Pf0Nfj 6 - . :P6	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gcS		j			j 1j 2j N	- Pf01fj 6 - . :2-	S8=	r c7 ScC

Client Sample ID: 6- 8M1

Date Collected: 9- /18/18 13:- 1

Date 5 eceiRed: 9- /29/18 9v:39

Lab Sample ID: 32902869- 04

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAat	Lab
r otalfEc	/ be5	/ gcS / be5			j R- J 7	j R1 J 7	j 1j 0j .	- Pf0Nfj 6 - . :P6	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gcS		j			j 1j 2j N	- Pf01fj 6 - . :P,	S8=	r c7 ScC

Client Sample ID: - 98- 2v0D

Date Collected: 9- /18/18 13:- 4

Date 5 eceiRed: 9- /29/18 9v:39

Lab Sample ID: 32902869- 0N

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAat	Lab
r otalfEc	/ be5	/ gcS / be5			j R- J 7	j R1 J 7	j 1j 0j .	- Pf0Nfj 6 - . :P6	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gcS		j			j 1j 2j N	- Pf01fj 6 - . :1	S8=	r c7 ScC

Client Sample ID: 4831v

Date Collected: 9- /18/18 1N:- 2

Date 5 eceiRed: 9- /29/18 9v:39

Lab Sample ID: 32902869- 06

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAat	Lab
r otalfEc	/ be5	/ gcS / be5			j R- J 7	j R1 J 7	j 1j 0j .	- Pf0Nfj 6 - . :P6	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gcS		j			j 1j 2j N	- Pf01fj 6 - . :0N	S8=	r c7 ScC

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Lab Chronicle

Client: Shannon & Wilson
 / Site: CitF okgailDamps gibe r baininB c bæ

restcJ elina l oD A : 20- 4061- P4

Client Sample ID: 66v988

Lab Sample ID: 32902869- 08

Date Collected: 9- /18/18 1- :NN

Matrix: Water

Date 5 eceiRed: 9- /29/18 9v:39

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAt	Lab
r otalfEc	/ bæ5	/ gc S / bæ5			j R- J 7	j R1 J 7	j 1j 0P1	- P f0Nfj 6 j - :0N	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gc S		j			j 1j 2j N	- P f0Nfj 6 j , :0N	S8=	r c7 ScC

Client Sample ID: MW0N98

Lab Sample ID: 32902869- 04

Date Collected: 9- /14/18 12:14

Matrix: Water

Date 5 eceiRed: 9- /29/18 9v:39

Brep 7Tpe	yatch 7Tpe	yatch Method	5 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAt	Lab
r otalfEc	/ bæ5	/ gc S / bæ5			j R- J 7	j R1 J 7	j 1j 0P1	- P f0Nfj 6 j - :0N	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gc S		j			j 1j 2j N	- P f0Nfj 6 j , :P2	S8=	r c7 ScC
r otalfEc	/ bæ5	/ gc S / bæ5	37		j R- J 7	j R1 J 7	j 1j 0P1	- P f0Nfj 6 j - :0N	CCL	r c7 ScC
r otalfEc	cnalFsis	/ gc S	37	j -			j 1000P	- Nf- 0fj 6 - 0j -	S8=	r c7 ScC

LaboratorT 5 eferenceA:

r c7 ScC v r estcJ elina SantaJ entoT , - =idebsiwe / alp9 aFTWest SantaJ entoTCc . N1- NTr 87 (. j 1)2624N1- -

restcJ elina SantaJ ento

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
 j ro/ectySite: Citf oFkairbangs kire Trainind Area

TestAmerica Job ID: 320-25801-P

Laboratory: TestAmerica Sacramento

All accre. itationsycertifications hel. bf this laboratorf are liste. Np ot all accre. itationsycertifications are a((licable to this re(ortN

Authority	Program	EPA Region	Identification Number	Expiration Date
Alasga U ST7	State j rodram	P0	) ST-0zz	P2-P9-P5
AriZona	State j rodram	E	AQ0509	09-PP-P5
Argansas D64	State j rodram	8	99-08EP	08-P5-P9
Califørnia	State j rodram	E	29E5	0P-3P-P9
Colora. o	State j rodram	9	CA00011	09-3P-P5
Connecticut	State j rodram	P	j H-08EP	08-30-P5
klori. a	p 6 LAj	1	695z50	08-30-P5
Hawaii	State j rodram	E	p yA	0P-2E-P9
Illinois	p 6 LAj	z	200080	03-P5-P9
* ansas	p 6 LAj	5	6-P035z	P0-3P-P5
L-A-K	DoD 6 LAj		L2189	0P-20-P9
Louisiana	p 6 LAj	8	308P2	08-30-P5
B aine	State j rodram	P	CA0001	01-P9-P9
B ichidan	State j rodram	z	EE15	0P-3P-P9
p eM. a	State j rodram	E	CA00011	05-3P-P5
p ew Ham(shire	p 6 LAj	P	2EE5	01-P9-P9
p ew Jersef	p 6 LAj	2	CA00z	08-30-P5
p ew v org	p 6 LAj	2	PP888	01-0P-P9
Yredon	p 6 LAj	P0	1010	0P-29-P9
j ennsf IMania	p 6 LAj	3	89-0P252	03-3P-P9
TeQas	p 6 LAj	8	TP015013EE	05-3P-P5
) S kish & Wil. lifē	ke. eral		L6P19399-0	P0-3P-P5
) SDA	ke. eral		j 330-PP-00138	P2-30-P5
) S6j A) CB x	ke. eral	P	CA00011	PP-08-P9
) tah	p 6 LAj	9	CA00011	02-29-P9
Rirdinia	p 6 LAj	3	180259	03-P1-P9
Washindton	State j rodram	P0	Cz9P	0z-0z-P9
West Rirdinia UDW7	State j rodram	3	EE30C	P2-3P-P5
Wf omind	State j rodram	9	9TB S-L	0P-2E-P5 V

VAccre. itationyCertification renewal (en. ind - accre. itationyCertification consi. ere. Mili. N

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Method	Method Description	Protocol	Laboratory
PFAS	Perfluorinated Alkyl Substances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27604-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-27604-1	167801	Water	04/17/17 10:41	04/20/17 09:30
320-27604-2	167901	Water	04/17/17 10:45	04/20/17 09:30
320-27604-3	167983	Water	04/17/17 11:14	04/20/17 09:30
320-27604-4	64751	Water	04/17/17 13:41	04/20/17 09:30
320-27604-5	407429-D	Water	04/17/17 13:48	04/20/17 09:30
320-27604-6	87319	Water	04/17/17 15:42	04/20/17 09:30
320-27604-7	669077	Water	04/17/17 14:55	04/20/17 09:30
320-27604-8	MW-507	Water	04/18/17 12:18	04/20/17 09:30

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8029

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test American
Attn: David Altmeppen

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Total Number of Containers	Remarks/Matrix
167801		1041	4/17/17	X	X	2	groundwater
167901		1045		X	X	2	
1678983		1114		X	X	2	
64751		1341		X	X	2	
407429-D		1348		X	X	2	
87319		1542		X	X	2	
669077		1455		X	X	2	
MW-507		1218	4/18/17	X	X	2	

Project Information Project Number: <u>31-111735</u> Project Name: <u>CoF Reg. Fire Tr. Cont.</u> Contact: <u>MDN</u> Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: <u>MDN/ARW</u>		Sample Receipt Total Number of Containers: <u>16</u> COC Seals/Intact? Y/N/NA: <u>—</u> Received Good Cond./Cold: <u>—</u> Delivery Method: <u>Fed Ex</u> (attach shipping bill, if any)		Relinquished By: 1. Signature: <u>M. Nadel</u> Time: <u>4/19/17</u> Printed Name: <u>Marcy Nadel</u> Date: <u>4/20/17</u> Company: <u>Shannon & Wilson</u>		Relinquished By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Relinquished By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____	
Instructions Requested Turnaround Time: <u>Standard</u> Special Instructions: <u>Please bill to 31-111735 -008</u>				Received By: 1. Signature: <u>C. E. Edman</u> Time: <u>0930</u> Printed Name: <u>Connor Edman</u> Date: <u>4/20/17</u> Company: <u>TAWs</u>		Received By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File



320-27604 Chain of Custody

No. 34282

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-2710T-R

Login Number: 27604

List Source: TestAmerica Sacramento

List Number: 1

Creator: Turpen, Troy

Question	Answer	Comment
v ayioactiwit' k asnt chec/ ey or is =g bac/ f rouny as measurey b' a surve' meterp	drue	
dhe cooler's custoy' seal, iAQresent, is intactp	drue	ShannongWilson Seals
SamQe custoy' seals, iAQresent, are intactp	NgF	
dhe cooler or samQes yo not aQear to have been comQromisey or tamQerey k ithp	drue	
SamQes k ere receivey on icep	drue	
Cooler demQerature is acceQtablep	drue	
Cooler demQerature is recoryeyp	drue	
C? C is Qresentp	drue	
C? C is Alley out in in/ any lef iblep	drue	
C? C is Alley out k ith all Qertinent inAQrmatioqp	drue	
Is the Hiely SamQers name Qresent on C? C(	drue	
there are no yiscreQancies betk een the containers receivey any the C? Cp	drue	
SamQes are receivey k ithin x olyinf dime)ePcluyinf tests k ith immeiyate x dsV	drue	
SamQe containers have lef ible labels	drue	
Containers are not bro/ en or lea/ inf p	drue	
SamQe collection yategimes are Qrowiyeyp	drue	
FOQroQriate samQe containers are useyp	drue	
SamQe bottles are comQetel' Alley	drue	
SamQe qreservation MeriAeyp	NgF	
dhere is suAQcient wolpAr all reDuestey anal' ses, inclpan' reDuestey z Sg S6 s	drue	
Containers reDuirinf 4ero heaysQace have no heaysQace or bubble is =1mm)Rg"v	drue	
z ultiQhasic samQes are not Qresentp	drue	
SamQes yo not reDuire sQittinf or comQositinf p	drue	
v esiyual Chlorine Chec/ ey	NgF	

Laboratory Data Review Checklist

Completed by:

Scott Hummel

Title:

Chemist

Date:

May 04, 2017

CS Report Name:

CoF Fire Training Area

Report Date:

May 03, 2017

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-27604-1

ADEC File Number:

102.38.182

Hazard Identification Number:

1. Laboratory

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

☐ Yes ☒ No

Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☐ Yes ☒ No

Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes ☐ No

Comments:

- b. Correct analyses requested?

☒ Yes ☐ No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

☒ Yes ☐ No

Comments:

The temperature is not documented on the Sample Receipt Documentation but the checklist does acknowledge that the cooler temperature was measured and acceptable. The cooler temp is recorded on the COC and is noted in the case narrative.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No

Comments:

There is no additional sample preservation besides temperature for requested project analytes.

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

☒ Yes ☐ No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☐ Yes ☒ No

Comments:

There were no discrepancies documented on the sample receipt checklist.

- e. Data quality or usability affected?

Comments:

The 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 laboratory noted that there was insufficient volume available to perform a matrix spike/matrix spike duplicate (MS/MSD) on samples associated with the preparation batches 320-161219 and 320-161246.

The laboratory noted the presence of sediment in samples 167801, 167901, 167983, 64751, and 87319.

- c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

There were no corrective actions necessary.

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

Comments:

The laboratory did not note 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:

Soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No

Comments:

The TestAmerica reporting limits (RLs), are less than applicable EPA lifetime drinking water health advisory levels and ADEC-proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The 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:

iii. If above LOQ, what samples are affected?

Comments:

N/A; PFOS and PFOA were not detected in the method blank.

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

☐ Yes ☒ No

Comments:

v. Data quality or usability affected?

Comments:

The 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:

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☒ No Comments:

There were no metal or inorganic analysis 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:

N/A, there were no percent recovery or RPD failures associated with this work order.

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

☐ Yes ☒ No Comments:

There were no percent recovery or RPD failures associated with this work order.

- vii. Data quality or usability affected?

Comments:

The 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:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No Comments:

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

☐ Yes ☒ No Comments:

There were no recovery discrepancies associated with sample results.

- iv. Data quality or usability affected?

Comments:

The data quality or usability are not affected.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No Comments:

Volatile analyses were not requested with this work order.

- 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:

A trip blank was not submitted with this work order.

- iii. All results less than LOQ?

☐ Yes ☒ No Comments:

A trip blank was not submitted with this work order.

- iv. If above LOQ, what samples are affected?

Comments:

N/A; a trip blank was not submitted with this work order.

- v. Data quality or usability affected?

Comments:

The 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:

The field-duplicate pair 167801/167901 was submitted with 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:

iv. Data quality or usability affected?

Comments:

The data quality or usability are not affected.

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

☐ Yes ☐ No ☒ Not Applicable

i. All results less than LOQ?

☐ Yes ☒ No

Comments:

Project samples are not collected with reusable equipment; an equipment blank is not required.

ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not included in this work order.

iii. Data quality or usability affected?

Comments:

The data quality or usability are not affected.

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

a. Defined and appropriate?

☐ Yes ☒ No

Comments:

No additional data flags or qualifiers are necessary.

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-27605-1

Client Project/Site: City of Fairbanks Fire Training Area

Revision: 1

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

5/3/2017 4:28:30 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

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results through

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The
Expert

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27605-1

Qualifiers

LCMS

Qualifier	Qualifier Description
-----------	-----------------------

J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
---	--

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
--------------	---

α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27605-1

Job ID: 320-27605-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-27605-1

Receipt

The samples were received on 4/20/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.5° C.

LCMS

Method(s) PFAS: The samples were analyzed by the in-line SPE method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.4 "Per- and Polyfluorinated Substances (PFAS) in Water, Soils, Sediments and Tissue":

Method(s) PFAS: The method blank for preparation batch 320-161861 contained Perfluorohexanesulfonic acid (PFHxS) above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

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

Organic Prep

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-161246.

Method(s) PFAS Prep: sediment present 167835-1 (320-27605-1) and 167835-2 (320-27605-2)

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

Detection Summary

LineSt: h&aSSoS W, insoSPISc
j ro/ectyhte: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-25701-C

Client Sample ID: 168963-1

Lab Sample ID: 320-27605-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
j erFidoro bdtasSedrfio Sic aci(B k) h N	C2		2.0	0.12	Suy0	C		j kAh	Totany4 A
j erFidoro&e6aSedrfio Sic aci(B k8 6h N	1C		2.0	0.x5	Suy0	C		j kAh	Totany4 A
j erFidoro&eHtaSoic aci(B k8 HAN	C2		2.0	0.x0	Suy0	C		j kAh	Totany4 A
j erFidoro octaSoic aci(B kp AN	Cx		2.0	0.51	Suy0	C		j kAh	Totany4 A
j erFidoro octaSedrfio Sic aci(B kp h N	C70		2.0	C.3	Suy0	C		j kAh	Totany4 A
j erFidoro SoSaSoic aci(B k4 AN	2.2		2.0	0.71	Suy0	C		j kAh	Totany4 A

Client Sample ID: 168963-2

Lab Sample ID: 320-27605-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
j erFidoro bdtasSedrfio Sic aci(B k) h N	C2		2.0	0.12	Suy0	C		j kAh	Totany4 A
j erFidoro&e6aSedrfio Sic aci(B k8 6h N	12		2.0	0.x5	Suy0	C		j kAh	Totany4 A
j erFidoro&eHtaSoic aci(B k8 HAN	C2		2.0	0.x0	Suy0	C		j kAh	Totany4 A
j erFidoro octaSoic aci(B kp AN	C7		2.0	0.51	Suy0	C		j kAh	Totany4 A
j erFidoro octaSedrfio Sic aci(B kp h N	000		2.0	C.3	Suy0	C		j kAh	Totany4 A
j erFidoro SoSaSoic aci(B k4 AN	C.1 J		2.0	0.71	Suy0	C		j kAh	Totany4 A

T&is DetectioShdmarrf (oes Sot iScrd(e ra(ioc&emicantest resdnts.

TestAmerica hacrameSto

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27605-1

Client Sample ID: 697493-6

Date Collected: 04/20/2018 04:21

Date Received: 04/20/2018 04:30

Lab Sample ID: 320-28901-6

Matrix: Water

MetPod: FA S - Fluorinated f ly(l Substances

f nal(te	Result	Qualifier	RL	MDL	z nit	D	Prepared	f nal(Jed	Dil Aac
Fluorobutanesulfonic acid FA) S.	62		2.0	0.92	ng/L		04/25/17 10:25	04/25/17 17:48	1
Fluoropexanesulfonic acid FAQxS.	16		2.0	0.87	ng/L		04/25/17 10:25	04/25/17 17:48	1
Fluoropeptanoic acid FAQpf .	62		2.0	0.80	ng/L		04/25/17 10:25	04/25/17 17:48	1
Fluorooctanoic acid FAHf .	67		2.0	0.75	ng/L		04/25/17 10:25	04/25/17 17:48	1
Fluorooctanesulfonic acid FAHS.	690		2.0	1.3	ng/L		04/25/17 10:25	04/25/17 17:48	1
Fluorononanoic acid FAOf .	25		2.0	0.65	ng/L		04/25/17 10:25	04/25/17 17:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA0	124		45 - 152				2/ 04/50/ : 12745	2/ 04/50/ : 1: 7 3	1
1S8/ -PFOHx	115		45 - 152				2/ 04/50/ : 12745	2/ 04/50/ : 1: 7 3	1
1S8/ PFCx	12:		45 - 152				2/ 04/50/ : 12745	2/ 04/50/ : 1: 7 3	1
1S8/ PFC0	122		45 - 152				2/ 04/50/ : 12745	2/ 04/50/ : 1: 7 3	1
1S8 5 PFp x	12S		45 - 152				2/ 04/50/ : 12745	2/ 04/50/ : 1: 7 3	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27605-1

Client Sample ID: 697493-2

Date Collected: 04/20/2018 04:18

Date Received: 04/20/2018 04:30

Lab Sample ID: 320-28901-2

Matrix: Water

MetPod: FAf S - Fluorinated f ly(l Substances

f nal(te	Result	Qualifier	RL	MDL	z nit	D	Prepared	f nal(Jed	Dil Aac
Fluorobutanesulfonic acid	62		2.0	0.92	ng/L		04/25/17 10:25	04/25/17 18:06	1
FA) S.									
FluoroPexanesulfonic acid	12		2.0	0.87	ng/L		04/25/17 10:25	04/25/17 18:06	1
FAQxS.									
FluoroPeptanoic acid FAQpf .	62		2.0	0.80	ng/L		04/25/17 10:25	04/25/17 18:06	1
Fluorooctanoic acid FAHf .	69		2.0	0.75	ng/L		04/25/17 10:25	04/25/17 18:06	1
Fluorooctanesulfonic acid	6/ 0		2.0	1.3	ng/L		04/25/17 10:25	04/25/17 18:06	1
FAHS.									
Fluorononanoic acid FAOf .	651 N		2.0	0.65	ng/L		04/25/17 10:25	04/25/17 18:06	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA0	12N		45 - 152	2/ 04/50/17: 12745	2/ 04/50/17: 1372N	1
1S8/ -PFOHx	144		45 - 152	2/ 04/50/17: 12745	2/ 04/50/17: 1372N	1
1S8/ PFCx	11N		45 - 152	2/ 04/50/17: 12745	2/ 04/50/17: 1372N	1
1S8/ PFC0	121		45 - 152	2/ 04/50/17: 12745	2/ 04/50/17: 1372N	1
1S8 5 PFp x	112		45 - 152	2/ 04/50/17: 12745	2/ 04/50/17: 1372N	1

TestAmerica Sacramento

Isotope Dilution Summary

Location: Hawthorne, CA
 Project: IITF of Fairbanks Airbase
 Area: T-1000

TestAmerica Job ID: 320-25701-C

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		¹⁸ O2 PFHx (25-150)	¹³ C4-PFHx (25-150)	¹³ C4 PFOA (25-150)	¹³ C4 PFOA (25-150)	¹³ C5 PFNA (25-150)
320-25701-C	C74673-C	102	101	105	100	103
320-25701-2	C74673-2	107	122	107	100	100
8I h 320-C7C2L7y2-A	8ab I oStronh ampre	107	106	101	103	64
8I hD 320-C7C2L7y8-A	8ab I oStronh ampre Dup	107	103	106	100	65
MB 320-C7C2L7yC-A	Met&od BræSg	101	120	106	101	64

Surrogate Legend

¹⁴C4O2 j kHxh = ¹⁴C4O2 j kHxh
¹³C3I L-j kHpA = ¹³C3I L-j kHpA
¹³C3I L j kOA = ¹³C3I L j kOA
¹³C3I L j kOh = ¹³C3I L j kOh
¹³C3I 1 j kNA = ¹³C3I 1 j kNA

QC Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ecthyite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-25701-C

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-161246/1-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 161246

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j erFluorobdtaSesdrfioSic aci(B k) hN	. D		290	09.2	Suy4		06/21/05 00:21	06/21/05 06:27	C
j erFluoro&exaSesdrfioSic aci(B kHxhN	. D		290	09.5	Suy4		06/21/05 00:21	06/21/05 06:27	C
j erFluoro&eptaSoic aci(B kHpAN	. D		290	09.0	Suy4		06/21/05 00:21	06/21/05 06:27	C
j erFluorooctaSoic aci(B kOAN	. D		290	05.1	Suy4		06/21/05 00:21	06/21/05 06:27	C
j erFluorooctaSesdrfioSic aci(B kOhN	. D		290	03.8	Suy4		06/21/05 00:21	06/21/05 06:27	C
j erFluoroSoSaSoic aci(B k. AN	. D		290	09.1	Suy4		06/21/05 00:21	06/21/05 06:27	C

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		24 5140	0-/24/16 10:24	0-/24/16 1-:23	1
1Qp - PFHA9	121		24 5140	0-/24/16 10:24	0-/24/16 1-:23	1
1Qp - PFO9	10N		24 5140	0-/24/16 10:24	0-/24/16 1-:23	1
1Qp - PFOS	104		24 5140	0-/24/16 10:24	0-/24/16 1-:23	1
1Qp 4 PF79	NB		24 5140	0-/24/16 10:24	0-/24/16 1-:23	1

Lab Sample ID: LCS 320-161246/2-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 161246

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
j erFluorobdtaSesdrfioSic aci(B k) hN	C55	209C		Suy4		C20	11 - C65
j erFluoro&exaSesdrfioSic aci(B kHxhN	C89	229B		Suy4		C21	18 - C38
j erFluoro&eptaSoic aci(B kHpAN	209D	229L		Suy4		C06	73 - C31
j erFluorooctaSoic aci(B kOAN	209D	229B		Suy4		C06	73 - C6C
j erFluorooctaSesdrfioSic aci(B kOhN	C89	209B		Suy4		C01	65 - C72
j erFluoroSoSaSoic aci(B k. AN	209D	269		Suy4		C2C	5C - C60

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	103		24 5140
1Qp - PFHA9	11N		24 5140
1Qp - PFO9	104		24 5140
1Qp - PFOS	10C		24 5140
1Qp 4 PF79	NB		24 5140

Lab Sample ID: LCSD 320-161246/3-A

Matrix: Water

Analysis Batch: 161315

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 161246

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
j erFluorobdtaSesdrfioSic aci(B k) hN	C55	209L		Suy4		C26	11 - C65	6	30
j erFluoro&exaSesdrfioSic aci(B kHxhN	C89	239		Suy4		C25	18 - C38	2	30
j erFluoro&eptaSoic aci(B kHpAN	209D	239B		Suy4		C08	73 - C31	3	30
j erFluorooctaSoic aci(B kOAN	209D	229B		Suy4		C02	73 - C6C	2	30
j erFluorooctaSesdrfioSic aci(B kOhN	C89	209		Suy4		C05	65 - C72	C	30
j erFluoroSoSaSoic aci(B k. AN	209D	269B		Suy4		C23	5C - C60	2	30

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS W, isoSPISc

Project: hite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-25701-C

LCSD		LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	103		24 5140
1Qp - PFHA9	11C		24 5140
1Qp - PFO9	10N		24 5140
1Qp - PFOS	101		24 5140
1Qp 4 PF79	N6		24 5140

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TestAmerica hacrameSto

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27605-1

LCMS

Prep Batch: 161246

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-27605-1	168963-1	Total/NA	Water	PFAS Prep	
320-27605-2	168963-2	Total/NA	Water	PFAS Prep	
MB 320-161246/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-161246/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-161246/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 161315

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-27605-1	168963-1	Total/NA	Water	PFAS	161246
320-27605-2	168963-2	Total/NA	Water	PFAS	161246
MB 320-161246/1-A	Method Blank	Total/NA	Water	PFAS	161246
LCS 320-161246/2-A	Lab Control Sample	Total/NA	Water	PFAS	161246
LCSD 320-161246/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	161246

Lab Chronicle

Client: Shannon & WilsonTAm
/ boyentfSite: CitF okgailDanps gibe r baininB c bea

r estcJ elima l oDA8 : 20- 4061- P4

Client Sample ID: 16846931

Date Collecte/ : 05/04/17 - 04:2M

Date v ecei7e/ : 05/04/17 - 04:90

Lab Sample ID: 92032- 60MB1

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalf7 c	/ be5	/ gcS / be5			j E- J .	j B1 J .	j 1j 0N1	- Nf0Pfj 6 j - :0P	CCL	r c. ScC
r otalf7 c	cnalFsis	/ gcS		j			j 1j 2j P	- Nf0Pfj 6 j 6:NR	S8=	r c. ScC

Client Sample ID: 16846932

Date Collecte/ : 05/04/17 - 04:M

Date v ecei7e/ : 05/04/17 - 04:90

Lab Sample ID: 92032- 60MB2

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
r otalf7 c	/ be5	/ gcS / be5			j E- J .	j B1 J .	j 1j 0N1	- Nf0Pfj 6 j - :0P	CCL	r c. ScC
r otalf7 c	cnalFsis	/ gcS		j			j 1j 2j P	- Nf0Pfj 6 j R- 1	S8=	r c. ScC

Laboratory v eferences:

r c. ScC , r estcJ elima SantaJ entoTRR = ivebside / altpwaFTWest SantaJ entoTCc 9P1- PTR 8. (9j 1)2624P1--

r estcJ elima SantaJ ento

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
 j ro/ectySite: Citf oFkairbangs kire Trainind Area

TestAmerica Job ID: 320-25801-P

Laboratory: TestAmerica Sacramento

All accre. itationsycertifications hel. bf this laboratorf are liste. Np ot all accre. itationsycertifications are a((licable to this re(ortN

Authority	Program	EPA Region	Identification Number	Expiration Date
Alasga U ST7	State j rodram	P0	) ST-011	P2-Pz-P5
Ari9ona	State j rodram	Z	AE050z	0z-PP-P5
Argansas DQ6	State j rodram	8	zz-08ZP	08-P5-Pz
Califørnia	State j rodram	Z	2zZ5	0P-3P-Pz
Colora. o	State j rodram	z	CA00044	0z-3P-P5
Connecticut	State j rodram	P	j H-08ZP	08-30-P5
klori. a	p QLAj	4	Qz5150	08-30-P5
Hawaii	State j rodram	Z	p yA	0P-2Z-Pz
Illinois	p QLAj	1	200080	03-P5-Pz
* ansas	p QLAj	5	Q-P0351	P0-3P-P5
L-A-K	DoD QLAj		L248z	0P-20-Pz
Louisiana	p QLAj	8	308P2	08-30-P5
Baine	State j rodram	P	CA0004	04-Pz-Pz
B ichidan	State j rodram	1	ZZ45	0P-3P-Pz
p eM. a	State j rodram	Z	CA00044	05-3P-P5
p ew Ham(shire	p QLAj	P	2ZZ5	04-Pz-Pz
p ew Jersef	p QLAj	2	CA001	08-30-P5
p ew v org	p QLAj	2	PP888	04-0P-Pz
Yredon	p QLAj	P0	4040	0P-2z-Pz
j ennsf IMania	p QLAj	3	8z-0P252	03-3P-Pz
TeQas	p QLAj	8	TP045043ZZ	05-3P-P5
) S kish & Wil. lifē	ke. eral		LQP4z3zz-0	P0-3P-P5
) SDA	ke. eral		j 330-PP-00438	P2-30-P5
) SQj A) CB x	ke. eral	P	CA00044	PP-08-Pz
) tah	p QLAj	z	CA00044	02-2z-Pz
Rirdinia	p QLAj	3	48025z	03-P4-Pz
Washindton	State j rodram	P0	C1zP	01-01-Pz
West Rirdinia UDW7	State j rodram	3	ZZ30C	P2-3P-P5
Wf omind	State j rodram	z	zTB S-L	0P-2Z-P5 V

VAccre. itationyCertification renewal (en. ind - accre. itationyCertification consi. ere. Mli. N

TestAmerica Sacramento

Method Summary

LineSt: h&aSSoS W, isoSPISc
j ro/ectyhite: l itf oFkairbaSgs kire TraiSiSL Area

TestAmerica Job ID: 320-25701-C

Method	Method Description	Protocol	Laboratory
j kAh	j erffloriSate= Angf nh dbstaSces	TAu-hAl	TAu hAl

Protocol References:

TAu-hAl OTestAmerica uaboratoriesP, est hacrameStoPkacintf htaS=ar= p . eratiSL j roce=dre8

Laboratory References:

TAu hAl OTestAmerica hacrameStoPRRO v iwersi=e j arg9 af P, est hacrameStoPl A 61701PTEu (6C7)353-1700

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27605-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-27605-1	168963-1	Water	04/19/17 09:25	04/20/17 09:30
320-27605-2	168963-2	Water	04/19/17 09:57	04/20/17 09:30



2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test America
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

Project Information	Sample Receipt
Project Number: 31-1-11735	Total Number of Containers 4
Project Name: Cof. Pkg. Frost. Cond.	COC Seals/Intact? Y/N/NA —
Contact: MDN	Received Good Cond./Cold —
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: Fed Ex
Sampler: MDN/APW	(attach shipping bill, if any)

Instructions	
Requested Turnaround Time:	Standard
Special Instructions:	Please bill to 31-1-11735-009

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Signature: <u>M. Nadel</u>	Time: <u>1020</u>	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: <u>Marcy Nadel</u>	Date: <u>4/19/17</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Received By: 1.		Received By: 2.		Received By: 3.	
Signature: <u>Connor Edman</u>	Time: <u>0930</u>	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: <u>Connor Edman</u>	Date: <u>4/20/17</u>	Printed Name: _____			
Company: <u>TAWS</u>	<u>5.50C</u>	Company: _____			
		 320-27605 Chain of Custody			

No. 34238

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-25701-T

Login Number: 27605

List Source: TestAmerica Sacramento

List Number: 1

Creator: Turpen, Troy

Question	Answer	Comment
d avioactiyitw' asnlk chec<ev or is / -g bac<. rounv as measurev bwa suryew meterf	Rue	
Rhe coolerls custovwseal, ipAresent, is intactf	Rue	Shannon-Wilson Seals
SamAle custovwseals, ipAresent, are intactf	NF	
Rhe cooler or samAles vo not aAAear to haye been comAromisev or tamAerev ' ithf	Rue	
SamAles ' ere receiyev on icef	Rue	
Cooler RemAerature is acceAtablef	Rue	
Cooler RemAerature is recorvevf	Rue	
Cq C is Aresentf	Rue	
Cq C is pllev out in in< anv le. iblef	Rue	
Cq C is pllev out ' ith all Aertinent inppormationf	Rue	
Is the Qelv SamAlerls name Aresent on Cq C?	Rue	
Rhere are no viscreAancies bet' een the containers receiyev anv the Cq Cf	Rue	
SamAles are receiyev ' ithin Holvin. Rime (excluvin. tests ' ith immeviate HRs)	Rue	
SamAle containers haye le. ible labelsf	Rue	
Containers are not bro<en or lea<in. f	Rue	
SamAle collection vate-times are Aroyivevf	Rue	
FAAroAriate samAle containers are usevf	Rue	
SamAle bottles are comAetelwpllevf	Rue	
SamAle Preseryation Veripevf	NF	
Rhere is suppicient yolf pr all reMuestev analwses, inclf anwreMuestev DS-D Sz s	Rue	
Containers reMuirin. 6ero heavsAce haye no heavsAce or bubble is / 7mm (T-4)f	Rue	
DultiAhasic samAles are not Aresentf	Rue	
SamAles vo not reMuire sAlittin. or comAositin. f	Rue	
desivual Chlorine Chec<evf	NF	

Laboratory Data Review Checklist

Completed by:

Marcy Nadel

Title:

Geologist

Date:

May 03, 2017

CS Report Name:

City of Fairbanks Fire
Training Area

Report Date:

May 03, 2017

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica, Inc.

Laboratory Report Number:

320-27605-1 REV01

ADEC File Number:

102.38.182

Hazard Identification Number:

1. Laboratory

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

☐ Yes ☐ No

Comments:

ADEC has not approved an analytical laboratory for this analysis. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☐ Yes ☐ No

Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes ☐ No

Comments:

- b. Correct analyses requested?

☒ Yes ☐ No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

☒ Yes ☐ No

Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No

Comments:

Analysis of PFCs does not require a preservative.

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

☒ Yes ☐ No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☒ No

Comments:

The name of sample 167835-1 (see COC) was changed to 168963-1 (see laboratory report). The name of sample 167835-2 was changed to 168963-2.

- e. Data quality or usability affected?

Comments:

The data quality and usability were unaffected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☒ No

Comments:

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

☒ Yes ☒ No

Comments:

The laboratory noted that sediment is present in each of the two samples.

There was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) analysis.

The laboratory also noted a method-blank detection in a different preparation batch (320-161861) from the batch containing samples in this work order (320-161246).

- c. Were all corrective actions documented?

☒ Yes ☒ No

Comments:

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

Comments:

There was no effect on the data quality or usability noted.

5. Samples Results

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

☒ Yes ☒ No

Comments:

b. All applicable holding times met?

☒ Yes ☐ No Comments:

The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

c. All soils reported on a dry weight basis?

☒ Yes ☐ No Comments:

Not applicable; no soil samples were submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No Comments:

The PQL, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC's proposed groundwater-cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were 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:

iii. If above LOQ, what samples are affected?

Comments:

None; PFCs were not detected in MB 320-161246/1-A.

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

☒ Yes ☐ No Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were unaffected.

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:

LCS/LCSD sample results were reported.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☒ No Comments:

Metals and inorganics were not analyzed as part of this work order.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No Comments:

Percent recoveries were within the ranges required by the laboratory method.

- 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:

The RPDs were within the laboratory limit.

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No samples were affected; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☒ No Comments:

No samples were affected; the percent recoveries and RPDs were within acceptable limits.

- vii. Data quality or usability affected?

Comments:

The data quality and usability were unaffected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No Comments:

Percent recoveries are within the laboratory limits.

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

☐ Yes ☒ No Comments:

Percent recoveries were within the laboratory limits; no flags are required.

- iv. Data quality or usability affected?

Comments:

The data quality and usability were unaffected.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No Comments:

PFCs are not volatile compounds; a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☒ No Comments:

No VOA samples were included in this work order.

- iii. All results less than LOQ?

☐ Yes ☒ No Comments:

Not applicable; no VOA samples were included in this work order.

- iv. If above LOQ, what samples are affected?

Comments:

Not applicable; no VOA samples were included in this work order.

- v. Data quality or usability affected?

Comments:

Not applicable; no VOA samples were included in this work order.

e. Field Duplicate

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

☒ Yes ☐ No

Comments:

A field-duplicate pair was not submitted with this work order; however, field duplicates are submitted at the appropriate frequency for the overall project.

ii. Submitted blind to lab?

☐ Yes ☐ No

Comments:

A field-duplicate pair was not submitted with 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:

Not applicable; a field-duplicate pair was not submitted with this work order.

iv. Data quality or usability affected?

Comments:

Not applicable; a field-duplicate pair was not submitted with this work order.

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

☐ Yes ☐ No ☒ Not Applicable

i. All results less than LOQ?

☐ Yes ☒ No

Comments:

Reusable equipment was not used during sample collection for this work order, so an equipment blank is not required.

ii. If above LOQ, what samples are affected?

Comments:

Not applicable; a field-duplicate pair was not submitted with this work order.

iii. Data quality or usability affected?

Comments:

A field-duplicate pair was not submitted with this work order; see above.

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

a. Defined and appropriate?

☒ Yes ☐ No

Comments:

There were no other data qualifiers used.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-28113-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

5/24/2017 10:29:59 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

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results through

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28113-1

Qualifiers

LCMS

Qualifier	Qualifier Description
-----------	-----------------------

J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
---	--

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
--------------	---

α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Site: City of Yuba County Fire Training Area

TestAmerica Job ID: 320-27663-6

Job ID: 320-28113-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-28113-1

Receipt

The samples were received on 5/20/2016 at 9:20 AM; the samples arrived in good condition, properly preserved, and were required, on ice. The temperature of the cooler at receipt was 3.5° C.

LCMS

Method(s) 4 yAS: The samples were analyzed by the in-line S4E method/protocol in TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-002 Rev. 2.5 "4-ethylphenol/fluorinated Substances (4 yAS) in Water, Soils, Sediments and Tissue"

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

Organic Prep

Method(s) 4 yAS 4 rep: sediments present.
2x697 (320-27663-6) and 6x7x0 (320-27663-2)

Method(s) 4 yAS 4 rep: Insufficient sample volume was available to perform a matrix spike/recovery (MSR/MSD) associated with preparation batch 320-6x520x.

Method(s) 4 yAS 4 rep: Insufficient sample volume was available to perform a matrix spike/recovery (MSR/MSD) associated with preparation batch 320-6x5d75.

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

Detection Summary

1 Cell: nSal l ol h & iSol Wl c
 , roEctjnite: 1 it/ oyf airbal Fs f ire Trail il k Area

TestAmerica Job ID: 320-25773-7

Client Sample ID: 267198

Lab Sample ID: 320-28113-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
, ery@oroSeual esg@ol ic acid (, f Bun)	719	J	210	0159	l kj.	7			, f An	Tota@L A
, ery@oroOctal oic acid (, f 4 A)	210		210	0196	l kj.	7			, f An	Tota@L A
, ery@oroOctal esg@ol ic acid (, f 4 n)	718	J	210	713	l kj.	7			, f An	Tota@L A
, ery@orol ol al oic acid (, f LA)	3111		210	0116	l kj.	7			, f An	Tota@L A

Client Sample ID: 167860

Lab Sample ID: 320-28113-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
, ery@orobgtal esg@ol ic acid (, f p n)	217		210	0182	l kj.	7			, f An	Tota@L A
, ery@oroSeual esg@ol ic acid (, f Bun)	77		210	0159	l kj.	7			, f An	Tota@L A
, ery@oroSe@al oic acid (, f BOA)	212		210	0150	l kj.	7			, f An	Tota@L A
, ery@oroOctal oic acid (, f 4 A)	1111		210	0196	l kj.	7			, f An	Tota@L A
, ery@oroOctal esg@ol ic acid (, f 4 n)	20		210	713	l kj.	7			, f An	Tota@L A
, ery@orol ol al oic acid (, f LA)	01111	J	210	0116	l kj.	7			, f An	Tota@L A

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28113-1

Client Sample ID: 216978

Date Collected: 06/08/96 99:0d

Date Received: 06/09/96 07:2d

Lab Sample ID: 320-28993-9

4 at 100 : x at 100

4 ethyl: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		05/12/17 11:39	05/12/17 21:36	1
Perfluoropentanesulfonic acid (PFPeA)	9.6	Q	2.0	0.87	ng/L		05/12/17 11:39	05/12/17 21:36	1
Perfluorohexanoic acid (PFHpA)	ND		2.0	0.80	ng/L		05/12/17 11:39	05/12/17 21:36	1
Perfluorooctanoic acid (PFHxA)	2.0		2.0	0.75	ng/L		05/12/17 11:39	05/12/17 21:36	1
Perfluorooctanesulfonic acid (PFOS)	9.7	Q	2.0	1.3	ng/L		05/12/17 11:39	05/12/17 21:36	1
Perfluorodecanoic acid (PFDA)	3.5		2.0	0.65	ng/L		05/12/17 11:39	05/12/17 21:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
18O2 PFHxS	101		24 5140				04-12-1/ 116 3	04-12-1/ 216 C	1
1: pA PFH9N	113		24 5140				04-12-1/ 116 3	04-12-1/ 216 C	1
1: pA PFON	11A		24 5140				04-12-1/ 116 3	04-12-1/ 216 C	1
1: pA PFOS	104		24 5140				04-12-1/ 116 3	04-12-1/ 216 C	1
1: p4 PF7N	114		24 5140				04-12-1/ 116 3	04-12-1/ 216 C	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28113-1

Client Sample ID: 916810

Date Collected: 06/08/96 9d:06

Date Received: 06/90/96 07:2d

Lab Sample ID: 320-28993-2

4 at 11: x at 11

4 ethyl: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	4 DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonic acid	219		2.0	0.92	ng/L		05/12/17 11:39	05/12/17 21:55	1
PFNSz									
Perfluorohexanesulfonic acid	99		2.0	0.87	ng/L		05/12/17 11:39	05/12/17 21:55	1
PFJ r Sz									
Perfluorooctanoic acid	212		2.0	0.80	ng/L		05/12/17 11:39	05/12/17 21:55	1
PFH z	515		2.0	0.75	ng/L		05/12/17 11:39	05/12/17 21:55	1
Perfluorooctanesulfonic acid	20		2.0	1.3	ng/L		05/12/17 11:39	05/12/17 21:55	1
PFH Sz									
Perfluorodecanoic acid	065	Q	2.0	0.65	ng/L		05/12/17 11:39	05/12/17 21:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	84		24 5140	04-12-1/ 116 3	04-12-1/ 21614	1
1: p A PFH9N	101		24 5140	04-12-1/ 116 3	04-12-1/ 21614	1
1: p A PFON	3:		24 5140	04-12-1/ 116 3	04-12-1/ 21614	1
1: p A PFOS	82		24 5140	04-12-1/ 116 3	04-12-1/ 21614	1
1: p 4 PF7N	83		24 5140	04-12-1/ 116 3	04-12-1/ 21614	1

TestAmerica Sacramento

Isotope Dilution Summary

100% of the total sample is analyzed for PFAS in the
 , reflecting the total sample area

TestAmerica Job ID: 320-25773-7

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		302 PFHx (25-150)	3C4-PFHx (25-150)	3C4 PFOA (25-150)	3C4 PFOA (25-150)	3C5 PFNA (25-150)
320-25773-7	2687g5	707	77g	779	704	774
320-25773-2	768560	54	707	g3	52	5g
L1 n 320-769206j2-A	Lab 1 of 10 samples	777	730	720	777	773
L1 nD 320-769206j3-A	Lab 1 of 10 samples Dup	704	722	779	708	708
MB 320-769206j7-A	MetSod B&I F	708	726	779	777	777

Surrogate Legend

75O2 , f Hxn = 75O2 , f Hxn
 7319-, f HpA = 7319-, f HpA
 7319 , f OA = 7319 , f OA
 7319 , f On = 7319 , f On
 7314 , f NA = 7314 , f NA

QC Sample Results

1 Cell: nSal l ol h & iSol Wl c
 , rolectjnite: 1 it/ oyf airbal Fs f ire Trail il k Area

TestAmerica Job ID: 320-25773-7

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-164206/1-A

Matrix: Water

Analysis Batch: 164285

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 164206

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
, ery@orobgtal esg@ol ic aciu d f (nB	) D		2N	0N2	I kj9		0Lj72j74 77:3.	0Lj72j74 7. :68	7
, ery@oroSexal esg@ol ic aciu d f HxnB	) D		2N	0N4	I kj9		0Lj72j74 77:3.	0Lj72j74 7. :68	7
, ery@oroSeptal oic aciu d f HpAB	) D		2N	0N0	I kj9		0Lj72j74 77:3.	0Lj72j74 7. :68	7
, ery@oroOctal oic aciu d f OAB	) D		2N	0N4L	I kj9		0Lj72j74 77:3.	0Lj72j74 7. :68	7
, ery@oroOctal esg@ol ic aciu d f OnB	) D		2N	7N3	I kj9		0Lj72j74 77:3.	0Lj72j74 7. :68	7
, ery@orol ol al oic aciu d f) AB	) D		2N	0N8L	I kj9		0Lj72j74 77:3.	0Lj72j74 7. :68	7

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		25 - 150	05/12/14 11:p6	05/12/14 16:3C	1
1pA3-PFH9N	12C		25 - 150	05/12/14 11:p6	05/12/14 16:3C	1
1pA3 PFON	113		25 - 150	05/12/14 11:p6	05/12/14 16:3C	1
1pA3 PFOS	111		25 - 150	05/12/14 11:p6	05/12/14 16:3C	1
1pA5 PF7N	111		25 - 150	05/12/14 11:p6	05/12/14 16:3C	1

Lab Sample ID: LCS 320-164206/2-A

Matrix: Water

Analysis Batch: 164285

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 164206

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
, ery@orobgtal esg@ol ic aciu d f (nB	74N4	75N8		I kj9		70L	LL - 764
, ery@oroSexal esg@ol ic aciu d f HxnB	75N2	20N8		I kj9		773	L5 - 735
, ery@oroSeptal oic aciu d f HpAB	20N0	7. N		I kj9		.	83 - 73L
, ery@oroOctal oic aciu d f OAB	20N0	20N3		I kj9		702	83 - 767
, ery@oroOctal esg@ol ic aciu d f OnB	75N8	20N7		I kj9		705	64 - 782
, ery@orol ol al oic aciu d f) AB	20N0	27N4		I kj9		70.	47 - 760

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	111		25 - 150
1pA3-PFH9N	1p0		25 - 150
1pA3 PFON	120		25 - 150
1pA3 PFOS	111		25 - 150
1pA5 PF7N	11p		25 - 150

Lab Sample ID: LCSD 320-164206/3-A

Matrix: Water

Analysis Batch: 164285

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 164206

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
, ery@orobgtal esg@ol ic aciu d f (nB	74N4	27N0		I kj9		77.	LL - 764	72	30
, ery@oroSexal esg@ol ic aciu d f HxnB	75N2	22N2		I kj9		722	L5 - 735	5	30
, ery@oroSeptal oic aciu d f HpAB	20N0	27N8		I kj9		705	83 - 73L	5	30
, ery@oroOctal oic aciu d f OAB	20N0	27N8		I kj9		705	83 - 767	8	30
, ery@oroOctal esg@ol ic aciu d f OnB	75N8	22N0		I kj9		77.	64 - 782	.	30
, ery@orol ol al oic aciu d f) AB	20N0	26N2		I kj9		727	47 - 760	77	30

TestAmerica nacramel to

QC Sample Results

TestAmerica Job ID: 320-25773-7

100% of total sample weight

, reagent: 100% of total sample weight

LCSD		LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	105		25 - 150
1pA3-PFH9N	122		25 - 150
1pA3 PFON	113		25 - 150
1pA3 PFOS	104		25 - 150
1pA5 PF7N	104		25 - 150

TestAmerica nacranel to

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28113-1

LCMS

Prep Batch: 164206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28113-1	267198	Total/NA	Water	PFAS Prep	
320-28113-2	167860	Total/NA	Water	PFAS Prep	
MB 320-164206/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-164206/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-164206/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 164285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28113-1	267198	Total/NA	Water	PFAS	164206
320-28113-2	167860	Total/NA	Water	PFAS	164206
MB 320-164206/1-A	Method Blank	Total/NA	Water	PFAS	164206
LCS 320-164206/2-A	Lab Control Sample	Total/NA	Water	PFAS	164206
LCSD 320-164206/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	164206

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28113-1

Client Sample ID: 168320

Date Collected: 5/15/18 3:51

Date received: 5/15/18 5:21

Lab Sample ID: - 1571033-73

Matrix: Water

Prep Type	Batch Type	Batch Method	Volume	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	164206	05/12/17 11:39	TON	TAL SAC
Total/NA	Analysis	PFAS		1			164285	05/12/17 21:36	SER	TAL SAC

Client Sample ID: 368065

Date Collected: 5/15/18 3:58

Date received: 5/15/18 5:21

Lab Sample ID: - 1571033-71

Matrix: Water

Prep Type	Batch Type	Batch Method	Volume	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	164206	05/12/17 11:39	TON	TAL SAC
Total/NA	Analysis	PFAS		1			164285	05/12/17 21:55	SER	TAL SAC

Laboratory references:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
 Project Site: City of Airborne Fire Training Area

TestAmerica Job ID: 320-25883-8

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska STU	State 1 program	80	(ST-0)	82-85-87
Arizona	State 1 program	9	AZ0705	05-88-87
Arkansas DEQ	State 1 program	6	55-0698	06-87-85
California	State 1 program	9	2597	08-38-85
Colorado	State 1 program	5	CA00044	05-38-87
Connecticut	State 1 program	8	1H-0698	06-30-87
Florida	. ELA1	4	E57) 70	06-30-87
Hawaii	State 1 program	9	. JA	08-29-85
Illinois	. ELA1	)	200060	03-87-85
Indiana	. ELA1	7	E-8037)	80-38-87
L-A-K	DoD ELA1		L2465	08-20-85
Louisiana	. ELA1	6	30682	06-30-87
Maine	State 1 program	8	CA0004	04-85-85
Michigan	State 1 program	)	9947	08-38-85
Minnesota	State 1 program	9	CA00044	07-38-87
New Hampshire	. ELA1	8	2997	04-85-85
New Jersey	. ELA1	2	CA00)	06-30-87
New York	. ELA1	2	88666	04-08-85
Oregon	. ELA1	80	4040	08-25-85
Tennessee/Indiana	. ELA1	3	65-08272	03-38-85
Texas	. ELA1	6	T804704399	07-38-87
US Fish & Wildlife	Federal		LE845355-0	80-38-87
USDA	Federal		1330-88-00436	82-30-87
USEPA (CBX)	Federal	8	CA00044	88-06-85
Vermont	. ELA1	5	CA00044	02-25-85
Virginia	. ELA1	3	460275	03-84-85
Washington	State 1 program	80	C) 58	0) -0) -85
West Virginia/DWU	State 1 program	3	9930C	82-38-87
Wisconsin	State 1 program	5	5TB S-L	08-29-87 V

Method Summary

1. Objective: To determine the effect of the treatment on the

2. Study Design: A randomized, double-blind, placebo-controlled trial.

TestAmerica Job ID: 320-25883-8

Method	Method Description	Protocol	Laboratory
1. f. An	1. ery. Coril ateu A. ChLbstal ces	TAg-nA1	TAg nA1

Protocol References:

TAg-nA1 d TestAmerica gaboratories. V& est nacramel to V& aci. n tal uaru = Ceratil k , roceuLrep

Laboratory References:

TAg nA1 d TestAmerica nacramel to V& 50 . iPersiue , arFv a/ V& est nacramel to V& A w9609V& Eg (w86)373-9600

TestAmerica nacramel to

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28113-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-28113-1	267198	Water	05/08/17 11:05	05/10/17 09:25
320-28113-2	167860	Water	05/08/17 15:07	05/10/17 09:25



2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Page 1 of 1
Laboratory Test America
Attn: David Althacker

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

320-28113 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: 31-1-11735	Total Number of Containers: 4	Signature: [Signature]		Signature: [Signature]		Signature: [Signature]		Signature: [Signature]	
Project Name: W/F Reg. Fire Tract	COC Seals/Intact? Y/N/NA: —	Time: 1100		Time: [Blank]		Time: [Blank]		Time: [Blank]	
Contact: MDN	Received Good Cond./Cold: —	Printed Name: [Signature]		Printed Name: [Blank]		Printed Name: [Blank]		Printed Name: [Blank]	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: FedEx	Date: 5/9/17		Date: [Blank]		Date: [Blank]		Date: [Blank]	
Sampler: TGR	(attach shipping bill, if any)	Company: Shannon & Wilson, Inc.		Company: [Blank]		Company: [Blank]		Company: [Blank]	
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: Standard				Signature: [Signature]		Signature: [Blank]		Signature: [Blank]	
Special Instructions: Please call 31-1-11735-009				Time: 925		Time: [Blank]		Time: [Blank]	
				Printed Name: [Signature]		Printed Name: [Blank]		Printed Name: [Blank]	
				Date: 5/10/17		Date: [Blank]		Date: [Blank]	
				Company: Alonso Aguayo		Company: [Blank]		Company: [Blank]	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson Lab File				TAWs 3.4°C		Company: [Blank]		Company: [Blank]	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

No. 34577



2705 Saint Andrews Loop, Suite A
Pasco, WA 99001-3378
(509) 846-6909

1521 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

Page 1 of 1

Laboratory: Test America
Attn: David H. Miller

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

320-28113 Chain of Custody

Project Information		Sample Receipt	
Project Number: 3-1-11735	Total Number of Containers: 4		
Project Name: CDFR FinTech	COC Seals/Intact? Y/N/NA: -		
Contact: MON	Received Good Cond./Cold: -		
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: FedEx		
Sampler: TSC	(attach shipping bill, if any)		

Instructions	
Requested Turnaround Time: Standard	
Special Instructions: Please call 3-1-11735-009	

Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Signature: M. Hall	Time: 11:00	Signature:	Time:	Signature:	Time:
Printed Name: M. Hall	Date: 5/11/17	Printed Name:	Date:	Printed Name:	Date:
Company: Shannon & Wilson, Inc.		Company:		Company:	

Received By: 1.		Received By: 2.		Received By: 3.	
Signature: [Signature]	Time: 9:25	Signature:	Time:	Signature:	Time:
Printed Name: Alonso Aguayo	Date: 5/16/17	Printed Name:	Date:	Printed Name:	Date:
Company: TAWS	3.4%	Company:		Company:	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files

F-19-91/UH

No. 34577

Page 17 of 18

5/24/2017

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-28113-1

Login Number: 28113

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

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

Laboratory Data Review Checklist

Completed by:

Marcy Nadel

Title:

Geologist

Date:

May 26, 2017

CS Report Name:

City of Fairbanks Fire
Training Area

Report Date:

May 24, 2017

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica, Inc.

Laboratory Report Number:

320-28113-1

ADEC File Number:

102.38.182

Hazard Identification Number:

26309

1. Laboratory

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

☒ Yes ☐ No

Comments:

ADEC has not approved an analytical laboratory for analysis of PFCs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☒ Yes ☐ No

Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes ☐ No

Comments:

- b. Correct analyses requested?

☒ Yes ☐ No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

☒ Yes ☐ No

Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒ Yes ☐ No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No

Comments:

N/A; there were no discrepancies reported by the laboratory.

- e. Data quality or usability affected?

Comments:

The data quality and usability were unaffected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

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

☒ Yes ☐ No

Comments:

The following case narrative notes relate to samples in this work order (WO).

The laboratory noted that samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory was 3.4° C.

The laboratory noted that there was sediment present in water samples.

The laboratory noted that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) on samples associated with preparation batches 164206 and 164784.

- c. Were all corrective actions documented?

☒ Yes ☐ No

Comments:

A laboratory control sample (LCS) and LCS duplicate (LCSD) were extracted with this batch to demonstrate laboratory accuracy and precision.

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

Comments:

The laboratory did not specify 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:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

c. All soils reported on a dry weight basis?

☐ Yes ☒ No

Comments:

Soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No

Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were 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:

iii. If above LOQ, what samples are affected?

Comments:

N/A; PFCs were not detected in MB 320-164206/1-A.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No

Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No

Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

vii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No Comments:

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

☐ Yes ☒ No Comments:

Qualification of the results was not required; see above.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No Comments:

PFCs are not volatile compounds so a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this WO.

v. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

e. Field Duplicate

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

☒ Yes ☐ No

Comments:

A field-duplicate pair was not submitted with the two samples in this WO. However, field duplicates are submitted at the appropriate frequency for the overall project.

ii. Submitted blind to lab?

☐ Yes ☒ No

Comments:

N/A; a field-duplicate pair was not submitted with this WO.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
 R_2 = Field Duplicate Concentration

☐ Yes ☒ No

Comments:

N/A; a field-duplicate pair was not submitted with this WO.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

☐ Yes ☐ No ☒ Not Applicable

i. All results less than LOQ?

☐ Yes ☒ No

Comments:

Samples are not collected with reusable equipment so a practical potential for equipment based cross-contamination does not exist. For this reason, an equipment blank was not submitted.

ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☒ No

Comments:

There were no other flags or qualifiers required.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-28115-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

5/24/2017 10:32:39 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

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results through

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28115-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project Site: City of Airborne Fire Training Area

TestAmerica Job ID: 320-27664-6

Job ID: 320-25881-8

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-25881-8

Receipt

The sample was received on 4/6/2016 at 9:24 AM; the sample arrived in good condition, properly preserved and, as required, on ice. The temperature of the cooler at receipt was 3.5° C.

LCMS

Methov(s) 1f AS: The samples were analyzed by the in-line S1E method using TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0024 Rev. 2.5 "1f AS - Analysis of Volatile Organic Substances (1f AS) in Water, Soils, Sediments and Tissue". No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Methov(s) 1f AS 1reg: sediments present. 4935x0-2 (320-27664-6)

Methov(s) 1f AS 1reg: Insufficient sample volume was available to perform a matrix spike/recovery (MSjMSD) associated with the preparation batch 320-6x520x.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28115-1

Client Sample ID: 593460-2

Lab Sample ID: 320-28115-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	4.2		2.0	0.75	ng/L		1		PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	17		2.0	1.3	ng/L		1		PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28115-1

Client Sample ID: 763840-2

Date Collected: 07/05/17 13:73

Date Received: 07/06/17 06:27

Lab Sample ID: 320-25117-1

9 at Mr : x ateM

9 ethVc: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prep Date	Analyte	Dil Factor
Perfluorooctanoic acid (PFOA)	82		2.0	0.75	ng/L		05/12/17 11:39	05/12/17 22:13	1
Perfluorooctanesulfonic acid (PFOS)	1/		2.0	1.3	ng/L		05/12/17 11:39	05/12/17 22:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
13C4 PFOA	119		52 - 129				9201501/ 1167	9201501/ 55613	1
13C4 PFOS	75		52 - 129				9201501/ 1167	9201501/ 55613	1

TestAmerica Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25881-8

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	3C4 PFO ₇ (25-150)	3C4 PFO ₈ (25-150)
320-25881-8	163740-2	880	64
9CS 320-847204/2-A	9ab Control SamLle	820	888
9CSD 320-847204/3-A	9ab Control SamLle DuL	887	80p
MB 320-847204/8-A	Method Blank	887	888

Surrogate Legend

83C7 PFOA = 83C7 PFOA

83C7 PFOS = 83C7 PFOS

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28115-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-164206/1-A

Matrix: Water

Analysis Batch: 164285

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 164206

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		05/12/17 11:39	05/12/17 19:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		05/12/17 11:39	05/12/17 19:46	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	114		95 215-				- 501901/ 11736	- 501901/ 1674:	1
13C4 PFOS	111		95 215-				- 501901/ 11736	- 501901/ 1674:	1

Lab Sample ID: LCS 320-164206/2-A

Matrix: Water

Analysis Batch: 164285

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 164206

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	20.3		ng/L		102	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	20.1		ng/L		108	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	19-		95 215-				
13C4 PFOS	111		95 215-				

Lab Sample ID: LCSD 320-164206/3-A

Matrix: Water

Analysis Batch: 164285

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 164206

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	21.6		ng/L		108	63 - 141	6	30
Perfluorooctanesulfonic acid (PFOS)	18.6	22.0		ng/L		119	47 - 162	9	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	114		95 215-						
13C4 PFOS	1-/		95 215-						

TestAmerica Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28115-1

LCMS

Prep Batch: 164206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28115-1	593460-2	Total/NA	Water	PFAS Prep	
MB 320-164206/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-164206/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-164206/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 164285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28115-1	593460-2	Total/NA	Water	PFAS	164206
MB 320-164206/1-A	Method Blank	Total/NA	Water	PFAS	164206
LCS 320-164206/2-A	Lab Control Sample	Total/NA	Water	PFAS	164206
LCSD 320-164206/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	164206

Lab Chronicle

Client: Shannon & Wilson, Inc
Site: Citif oFkairbangs kire Traininp Area

TestAmerica Job ID: 320-2811P-1

Client Sample ID: 16849320

Date Collecte/ : 315-5MRB:18

Date v ecei7e/ : 315B5MR36:01

Lab Sample ID: 80320-MMI2V

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
Totaly5 A	j reO	j kAS j reO			1.00 mL	1.66 mL	164206	0Py12y17 11:39	TN5	TAL SAC
Totaly5 A	Analf sis	j kAS		1			16428P	0Py12y17 22:13	SER	TAL SAC

Laboratory v eferences:

TAL SAC = TestAmerica Sacramento, 880 Riverside j argwaf , West Sacramento, CA 9P60P, TEL (916)373-P600

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25881-8

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	80	UST-011	82-85-87
Arizona	State Program	9	AZ0705	05-88-87
Arkansas DEQ	State Program	6	55-0698	06-87-85
California	State Program	9	2597	08-38-85
Colorado	State Program	5	CA00044	05-38-87
Connecticut	State Program	8	PH-0698	06-30-87
Florida	NELAP	4	E57170	06-30-87
Hawaii	State Program	9	N/A	08-29-85
Illinois	NELAP	1	200060	03-87-85
*ansas	NELAP	7	E-80371	80-38-87
L-A-K	DoD ELAP		L2465	08-20-85
Louisiana	NELAP	6	30682	06-30-87
Baine	State Program	8	CA0004	04-85-85
B ichigan	State Program	1	9947	08-38-85
NeMada	State Program	9	CA00044	07-38-87
New Hampshire	NELAP	8	2997	04-85-85
New Jersey	NELAP	2	CA001	06-30-87
New vork	NELAP	2	88666	04-08-85
Yregon	NELAP	80	4040	08-25-85
PennsylMania	NELAP	3	65-08272	03-38-85
TeQas	NELAP	6	T804704399	07-38-87
US Fish & Wildlife	Federal		LE845355-0	80-38-87
USDA	Federal		P330-88-00436	82-30-87
USEPA UCB x	Federal	8	CA00044	88-06-85
Utah	NELAP	5	CA00044	02-25-85
Rirginia	NELAP	3	460275	03-84-85
Washington	State Program	80	C158	01-01-85
West Rirginia (DW)	State Program	3	9930C	82-38-87
Wyoming	State Program	5	5TB S-L	08-29-87 V

VAccreditation/Certification renewal pending - accreditation/certification considered Nalid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25881-8

Method	Method Description	Protocol	Laboratory
PFAS	Perfluorinated Alkyl Substances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

TAL SAC = TestAmerica Sacramento, 550 Riverside Parkway, West Sacramento, CA 91601, TEL (986)373-1600

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25771-7

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-25771-7	163490-2	Water	01/05/78 73:13	01/70/78 06:21

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Test America
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: 31-1-11735		Total Number of Containers: 2		Signature: M. Nadel Time: 1100		Signature: Time: _____		Signature: Time: _____	
Project Name: COF Reg Fire Ctr		COC Seals/Intact? Y/N/NA: —		Printed Name: Date: 5/9/17		Printed Name: Date: _____		Printed Name: Date: _____	
Contact: MDN		Received Good Cond./Cold: —		Company: Marcy Nadel		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: FedEx		Company: Shannon & Wilson, Inc.		Company: _____		Company: _____	
Sampler: TXG		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: Standard				Signature: JAW Time: 925		Signature: Time: _____		Signature: Time: _____	
Special Instructions: Please b.11 31-1-11735-008				Printed Name: Date: 5/10/17		Printed Name: Date: _____		Printed Name: Date: _____	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson Lab Files				Company: JAWs 3.9°C		Company: _____		Company: _____	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

No. 34576

Client: Shannon & Wilson, Inc

Job Number: 320-25881-8

Login Number: 2588Q

List Number: 8

Creator: NelsonKy Dm T

List Source: 1estwmerica Sacramento

Auestion	wns, er	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	blue ice
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (8/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Laboratory Data Review Checklist

Completed by:

Marcy Nadel

Title:

Geologist

Date:

May 26, 2017

CS Report Name:

City of Fairbanks Fire
Training Area

Report Date:

May 24, 2017

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica, Inc.

Laboratory Report Number:

320-28115-1

ADEC File Number:

102.38.182

Hazard Identification Number:

26309

1. Laboratory

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

☒ Yes ☐ No

Comments:

ADEC has not approved an analytical laboratory for analysis of PFCs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☒ Yes ☐ No

Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes ☐ No

Comments:

- b. Correct analyses requested?

☒ Yes ☐ No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

☒ Yes ☐ No

Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒ Yes ☐ No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No

Comments:

N/A; there were no discrepancies reported by the laboratory.

- e. Data quality or usability affected?

Comments:

The data quality and usability were unaffected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

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

☒ Yes ☐ No

Comments:

The laboratory noted that samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory was 3.4° C.

The laboratory noted that there was sediment present in water sample 593460-2.

The laboratory noted that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batch 164206.

- c. Were all corrective actions documented?

☒ Yes ☐ No

Comments:

A laboratory control sample (LCS) and LCS duplicate (LCSD) were extracted with this batch to demonstrate laboratory accuracy and precision.

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

Comments:

The laboratory did not specify 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:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

c. All soils reported on a dry weight basis?

☐ Yes ☒ No

Comments:

Soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No

Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were 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:

iii. If above LOQ, what samples are affected?

Comments:

N/A; PFCs were not detected in MB 320-164206/1-A.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No

Comments:

Percent recoveries were within the ranges required by the laboratory method.

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:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

vii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No Comments:

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

☐ Yes ☒ No Comments:

Qualification of the results was not required; see above.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No Comments:

PFCs are not volatile compounds so a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this WO.

v. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

e. Field Duplicate

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

☒ Yes ☐ No

Comments:

A field-duplicate pair was not submitted with the two samples in this WO. However, field duplicates are submitted at the appropriate frequency for the overall project.

ii. Submitted blind to lab?

☐ Yes ☒ No

Comments:

N/A; a field-duplicate pair was not submitted with this WO.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
 R_2 = Field Duplicate Concentration

☐ Yes ☒ No

Comments:

N/A; a field-duplicate pair was not submitted with this WO.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

☐ Yes ☐ No ☒ Not Applicable

i. All results less than LOQ?

☐ Yes ☒ No

Comments:

Samples are not collected with reusable equipment so a practical potential for equipment based cross-contamination does not exist. For this reason, an equipment blank was not submitted.

ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☒ No

Comments:

No other qualifiers were required.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-28375-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

5/26/2017 9:24:46 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-27364-1

Job ID: 320-28375-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-28375-1

Receipt

The samples were received on 4/17/2016 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.95C.

LCMS

Method(s) PFAS: The sample was analyzed by the in-line SPz method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-CC-0024 Rev. 2.R "Per- and Polyfluorinated Substances (PFAS) in Water, Soils, Sediments and Tissue". No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Method(s) PFAS Prep: There is sediment present. 94x30 320-27364-1(

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-1x4x10.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-1

Client Sample ID: 16893

- aL Sample ID: 9b32b097625

Analyte	Result	Qualifier	R-	MD-	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.75	ng/L	1		PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	23		2.0	1.3	ng/L	1		PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-1

Client Sample ID: 95630

Date Collected: 05/15/17 11:22

Date Received: 05/18/17 09:50

Lab Sample ID: 320-28375-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.75	ng/L		05/22/17 15:54	05/23/17 15:33	1
Perfluorooctanesulfonic acid (PFOS)	23		2.0	1.3	ng/L		05/22/17 15:54	05/23/17 15:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	122		25 - 150				05/22/17 15:54	05/23/17 15:33	1
13C4 PFOS	107		25 - 150				05/22/17 15:54	05/23/17 15:33	1

TestAmerica Sacramento

Isotope Dilution Summary

Location: Hawthorne, CA
Project: Air Force Base Area

TestAmerica Job ID: 320-25381-C

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	3C4 PFO ₈ (25-150)	3C4 PFO ₉ (25-150)
320-25381-C	41730	122	108
91 h 320-C71700y2-A	9ab I oStronhamLre	120	108
91 hD 320-C71700y8-A	9ab I oStronhamLre DpL	122	100
u M320-C71700yC-A	u et&oB MaSg	107	48
Surrogate Legend			
C3I d j kOA = C3I d j kOA			
C3I d j kOh = C3I d j kOh			

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-165610/1-A

Matrix: Water

Analysis Batch: 165777

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 165610

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		05/22/17 15:54	05/23/17 14:38	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		05/22/17 15:54	05/23/17 14:38	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	125		- 0 / 102				207 - 718 10:04	207 3718 14:39	1
13C4 PFO6	S8		- 0 / 102				207 - 718 10:04	207 3718 14:39	1

Lab Sample ID: LCS 320-165610/2-A

Matrix: Water

Analysis Batch: 165777

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 165610

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	18.0		ng/L		90	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	17.5		ng/L		94	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	1- 2		- 0 / 102				
13C4 PFO6	128		- 0 / 102				

Lab Sample ID: LCSD 320-165610/3-A

Matrix: Water

Analysis Batch: 165777

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 165610

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	18.0		ng/L		90	63 - 141	0	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.8		ng/L		96	47 - 162	1	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	1- -		- 0 / 102						
13C4 PFO6	111		- 0 / 102						

TestAmerica Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-1

LCMS

Prep Batch: 165610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28375-1	95630	Total/NA	Water	PFAS Prep	
MB 320-165610/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-165610/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-165610/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 165777

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28375-1	95630	Total/NA	Water	PFAS	165610
MB 320-165610/1-A	Method Blank	Total/NA	Water	PFAS	165610
LCS 320-165610/2-A	Lab Control Sample	Total/NA	Water	PFAS	165610
LCSD 320-165610/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	165610

Lab Chronicle

Client: Shannon & Wilson, Inc
 / rojectfSite: CitF okgairbanps gire TraininOArea

TestAmerica Job ID: 320-2831P-j

Client Sample ID: 16832

Date Collecte/ : 26R/5R/7 MM00

Date v ecei9e/ : 26R/5R/7 21:62

Lab Sample ID: 302-05376-M

x atriW d ater

Prep Type	Batch Type	Batch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
Totalf7 A	/ reN	/ gAS / reN			j 400 mL	j 466 mL	j 6P6j 0	0Pf22fj 1 j P:P9	T5 7	TAL SAC
Totalf7 A	AnalFsis	/ gAS		j			j 6P111	0Pf23fj 1 j P:33	S. E	TAL SAC

Laboratory v eferences:

TAL SAC RTestAmerica Sacramento, 880 Ei=ersive / arpd aF, West Sacramento, CA wP60P, T. L (wj 6)313-P600

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
 Project Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25381-P

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska DSHS	State Laboratory	P0	ST-011	P2-P5-P8
Arizona	State Laboratory	9	AZ0805	05-PP-P8
Arkansas DEQ	State Laboratory	6	55-069P	06-P8-P5
California	State Laboratory	9	2598	0P-3P-P5
Colorado	State Laboratory	5	CA00044	05-3P-P8
Connecticut	State Laboratory	P	CT-H-069P	06-30-P8
Florida	PELAP	4	E58180	06-30-P8
Hawaii	State Laboratory	9	HA	0P-29-P5
Illinois	PELAP	1	200060	03-P8-P5
Indiana	PELAP	8	E-P0381	P0-3P-P8
L-A-K	DoD ELAP		L2465	0P-20-P5
Louisiana	PELAP	6	306P2	06-30-P8
Maine	State Laboratory	P	CA0004	04-P5-P5
Michigan	State Laboratory	1	9948	0P-3P-P5
Minnesota	State Laboratory	9	CA00044	08-3P-P8
New Hampshire	PELAP	P	2998	04-P5-P5
New Jersey	PELAP	2	CA001	06-30-P8
New York	PELAP	2	PP666	04-0P-P5
Oregon	PELAP	P0	4040	0P-25-P5
Pennsylvania	PELAP	3	65-0P282	03-3P-P5
Texas	PELAP	6	TP04804399	01-3P-P5
US Fish & Wildlife	KEEL		LEP45355-0	P0-3P-P8
USDA	KEEL		CT-330-PP-00436	P2-30-P8
US EPA CBX	KEEL	P	CA00044	PP-06-P5
Utah	PELAP	5	CA00044	02-25-P5
Virginia	PELAP	3	460285	03-P4-P5
Washington	State Laboratory	P0	C15P	01-01-P5
West Virginia DOW	State Laboratory	3	9930C	P2-3P-P8
Wisconsin	State Laboratory	5	5TB S-L	0P-29-P8 V

Accreditation/Certification renewal (pending - accreditation/certification considered valid).

TestAmerica Sacramento

Method Summary

LineSt: h&aSSoS W, isoSPISc
j ro/ectyhite: l itf oFkairbaSgs kire TraiSiSL Area

TestAmerica Job ID: 320-25371-C

Method	Method Description	Protocol	Laboratory
j kAh	j erffloriSate= Angf nh dbstaSces	TAu-hAl	TAu hAl

Protocol References:

TAu-hAl OTestAmerica uaboratoriesP, est hacrameStoPkacintf htaS=ar= p . eratiSL j roce=dre8

Laboratory References:

TAu hAl OTestAmerica hacrameStoP550 Riversi=e j argwaf P, est hacrameStoPl A 91601PTEu (906)373-1600

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-28375-1	95630	Water	05/15/17 11:22	05/18/17 09:50

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

CHAIN-OF-CUSTODY RECORD

Laboratory Test America Page 1 of 1
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

Project Information		Sample Receipt	
Project Number: <u>31-1-11735</u>	Total Number of Containers: <u>2</u>		
Project Name: <u>Cof Bay Fire Tr Can</u>	COC Seals/Intact? Y/N/NA: <u>—</u>		
Contact: <u>MDN</u>	Received Good Cond./Cold: <u>—</u>		
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: <u>Fed Ex</u>		
Sampler: <u>CAB</u>	(attach shipping bill, if any)		
Instructions			
Requested Turnaround Time: <u>Standard</u>			
Special Instructions: <u>Please bill to 31-1-11735-008</u>			
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File			

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

No. 34283

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-28375-1

Login Number: 28375

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

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

Laboratory Data Review Checklist

Completed by:

Marcy Nadel

Title:

Geologist

Date:

May 26, 2017

CS Report Name:

City of Fairbanks Fire
Training Area

Report Date:

May 26, 2017

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica, Inc.

Laboratory Report Number:

320-28375-1

ADEC File Number:

102.38.182

Hazard Identification Number:

26309

1. Laboratory

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

☒ Yes

☐ No

Comments:

ADEC has not approved an analytical laboratory for analysis of PFCs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☒ Yes

☐ No

Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes

☐ No

Comments:

- b. Correct analyses requested?

☒ Yes

☐ No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

☒ Yes

☐ No

Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes

☐ No

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒ Yes

☐ No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No

Comments:

N/A; there were no discrepancies reported by the laboratory.

- e. Data quality or usability affected?

Comments:

The data quality and usability were unaffected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

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

☒ Yes ☐ No

Comments:

The laboratory noted that samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory was 5.9° C.

The laboratory noted that there was sediment present in water sample 95630.

The laboratory noted that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batch 165610.

- c. Were all corrective actions documented?

☒ Yes ☐ No

Comments:

A laboratory control sample (LCS) and LCS duplicate (LCSD) were extracted with this batch to demonstrate laboratory accuracy and precision.

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

Comments:

The laboratory did not specify 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:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

c. All soils reported on a dry weight basis?

☐ Yes ☒ No

Comments:

Soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No

Comments:

The PQL, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were 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:

iii. If above LOQ, what samples are affected?

Comments:

N/A; PFCs were not detected in MB 320-165610/1-A.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

The data quality and usability were not affected.

Comments:

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:

LCS/LCSD sample results were reported.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☒ No

Comments:

Metals and inorganics were not analyzed as part of this work order.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No

Comments:

Percent recoveries were within the ranges required by the laboratory method.

- 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:

The RPDs were within laboratory limits. The maximum RPD was 1%.

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

- vii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No Comments:

Percent recoveries for surrogates are within the laboratory limits.

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

☐ Yes ☒ No Comments:

Qualification of the results was not required; see above.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No Comments:

PFCs are not volatile compounds so a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this WO.

v. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☒ Yes ☐ No

Comments:

A field-duplicate pair was not submitted with the one sample in this WO. However, field duplicates are submitted at the appropriate frequency for the overall project.

ii. Submitted blind to lab?

☒ Yes ☐ No

Comments:

N/A; a field-duplicate pair was not submitted with this WO.

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:

A field-duplicate pair was not submitted with this WO. The results are considered unaffected.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

☐ Yes ☐ No ☒ Not Applicable

i. All results less than LOQ?

☒ Yes ☐ No

Comments:

An equipment blank was not submitted with this WO. Reusable equipment was not utilized during sample collection; an equipment blank is not required.

ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☒ No

Comments:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-28375-2

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

5/26/2017 9:29:27 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-2

Qualifiers

LCMS

Qualifier	Qualifier Description
-----------	-----------------------

J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
---	--

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
--------------	---

α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project Site: City of Fairfield Fire Training Area

TestAmerica Job ID: 320-27364-2

Job ID: 320-28375-2

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-28375-2

Receipt

The samples were received on 4/27/2016 9:40 AM; the samples arrived in coolers, properly preserved and, as required, on ice. The temperature of the cooler at receipt was 4.95°C.

LCMS

Methox(1f AS: The sample was analyzed by the in-line S1z method developed by TestAmerica Sacramento. Standardization was performed using the following substances: 1f AS(in Water, Soils, Sediments and Tissue".

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

Organic Prep

Methox(1f AS 1reg: There is sediment present. 2x3d7R°320-27364-2(

Methox(1f AS 1reg: Insufficient sample volume was available to perform a matrix spike/recovery test. The sample was analyzed using the MS/MSD(associated with preparation batch 320-dx4xd0.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25371-2

Client Sample ID: 263184

Lab Sample ID: 320-28375-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.02	J	2.0	0.02	ng/.	4		PFAS	Total/LA
Perfluorohexanesulfonic acid (PF6S)	3.0		2.0	0.07	ng/.	4		PFAS	Total/LA
Perfluorohexanoic acid (PF6xA)	4.0	J	2.0	0.00	ng/.	4		PFAS	Total/LA
Perfluorooctanoic acid (PF8A)	1.0		2.0	0.01	ng/.	4		PFAS	Total/LA
Perfluorooctanesulfonic acid (PF8S)	3.0		2.0	4.0	ng/.	4		PFAS	Total/LA
Perfluorononanoic acid (PF9A)	7.0		2.0	0.01	ng/.	4		PFAS	Total/LA

This Detection Summary does not include radiochemical test results

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-2

Client Sample ID: 263784

Date Collected: 01/71/79 73:71

Date Received: 01/78/79 0h:10

Lab Sample ID: 320-28391-2

Matrix: Water

MetPod: FAf S - Ferfluorinated f ly(l Substances

f nal(te	Result	Hualiker	RL	MDL	Qnit	D	Prepared	f nal(Ued	Dil Aac
Ferfluorobutanesulfonic acid FAf S.	0.2	z	2.0	0.92	ng/L		05/22/17 15:54	05/23/17 15:51	1
Ferfluoropexanesulfonic acid FAOxS.	3.1		2.0	0.87	ng/L		05/22/17 15:54	05/23/17 15:51	1
Ferfluoropeptanoic acid FAOpf .	7.4	z	2.0	0.80	ng/L		05/22/17 15:54	05/23/17 15:51	1
Ferfluorooctanoic acid FA5 f .	4.7		2.0	0.75	ng/L		05/22/17 15:54	05/23/17 15:51	1
Ferfluorooctanesulfonic acid FA5 S.	3.1		2.0	1.3	ng/L		05/22/17 15:54	05/23/17 15:51	1
Ferfluorononanoic acid FANf .	9.2		2.0	0.65	ng/L		05/22/17 15:54	05/23/17 15:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	04		24 514-				- 4/22/16 14:43	- 4/20/16 14:41	1
1Qp 3PFHA9	11N		24 514-				- 4/22/16 14:43	- 4/20/16 14:41	1
1Qp 3 PFO9	1- 8		24 514-				- 4/22/16 14:43	- 4/20/16 14:41	1
1Qp 3 PFOS	88		24 514-				- 4/22/16 14:43	- 4/20/16 14:41	1
1Qp 4 PF79	03		24 514-				- 4/22/16 14:43	- 4/20/16 14:41	1

TestAmerica Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25371-2

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		3O2 PFHx (25-150)	3C4-PFHp (25-150)	3C4 PFOA (25-150)	3C4 PFOA (25-150)	3C5 PFNA (25-150)
320-25371-2	263458	91	446	405	55	98
LCS 320-461640/2-A	Lab Control Sample	420	488	420	407	428
LCSD 320-461640/3-A	Lab Control Sample Dup	445	488	422	444	405
MB 320-461640/4-A	Method Blank	443	438	406	97	442
Surrogate Legend						
45O2 PFHxS = 45O2 PFHxS						
43C8-PFHpA = 43C8-PFHpA						
43C8 PFOA = 43C8 PFOA						
43C8 PFOS = 43C8 PFOS						
43C1 PFNA = 43C1 PFNA						

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25371-2

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-165610/1-A

Matrix: Water

Analysis Batch: 165777

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 165610

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		01/22/47 41:16	01/23/47 46:35	4
Perfluoroheptanesulfonic acid (PFx 8S)	ND		2.0	0.57	ng/L		01/22/47 41:16	01/23/47 46:35	4
Perfluoroheptanoic acid (PFx HA)	ND		2.0	0.50	ng/L		01/22/47 41:16	01/23/47 46:35	4
Perfluorooctanoic acid (PFp A)	ND		2.0	0.71	ng/L		01/22/47 41:16	01/23/47 46:35	4
Perfluorooctanesulfonic acid (PFp S)	ND		2.0	4.3	ng/L		01/22/47 41:16	01/23/47 46:35	4
Perfluorononanoic acid (PFNA)	ND		2.0	0.01	ng/L		01/22/47 41:16	01/23/47 46:35	4

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		24 514-	- 4/22/16 14:34	- 4/20/16 1: 308	1
10C: PFHpA	10:		24 514-	- 4/22/16 14:34	- 4/20/16 1: 308	1
10C: PFOA	1- 9		24 514-	- 4/22/16 14:34	- 4/20/16 1: 308	1
10C: PFOS	N6		24 514-	- 4/22/16 14:34	- 4/20/16 1: 308	1
10C4 PF7A	112		24 514-	- 4/22/16 14:34	- 4/20/16 1: 308	1

Lab Sample ID: LCS 320-165610/2-A

Matrix: Water

Analysis Batch: 165777

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 165610

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	47.7	4Q1		ng/L		93	11 - 467
Perfluoroheptanesulfonic acid (PFx 8S)	45.2	47.5		ng/L		95	15 - 435
Perfluoroheptanoic acid (PFx HA)	20.0	47.2		ng/L		50	08 - 431
Perfluorooctanoic acid (PFp A)	20.0	45.0		ng/L		90	08 - 464
Perfluorooctanesulfonic acid (PFp S)	45.0	47.1		ng/L		96	67 - 402
Perfluorononanoic acid (PFNA)	20.0	45.3		ng/L		92	74 - 460

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	12-		24 514-
10C: PFHpA	1: :		24 514-
10C: PFOA	12-		24 514-
10C: PFOS	1- 6		24 514-
10C4 PF7A	12:		24 514-

Lab Sample ID: LCSD 320-165610/3-A

Matrix: Water

Analysis Batch: 165777

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 165610

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	47.7	47.2		ng/L		97	11 - 467	6	30
Perfluoroheptanesulfonic acid (PFx 8S)	45.2	45.1		ng/L		402	15 - 435	6	30
Perfluoroheptanoic acid (PFx HA)	20.0	45.4		ng/L		90	08 - 431	1	30
Perfluorooctanoic acid (PFp A)	20.0	45.0		ng/L		90	08 - 464	0	30
Perfluorooctanesulfonic acid (PFp S)	45.0	47.5		ng/L		90	67 - 402	4	30
Perfluorononanoic acid (PFNA)	20.0	49.7		ng/L		95	74 - 460	7	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc

Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25371-2

LCSD		LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	118		24 514-
10C: PFHpA	1:1		24 514-
10C: PFOA	122		24 514-
10C: PFOS	111		24 514-
10C4 PF7A	1-8		24 514-

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QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-2

LCMS

Prep Batch: 165610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28375-2	263184	Total/NA	Water	PFAS Prep	
MB 320-165610/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-165610/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-165610/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 165777

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28375-2	263184	Total/NA	Water	PFAS	165610
MB 320-165610/1-A	Method Blank	Total/NA	Water	PFAS	165610
LCS 320-165610/2-A	Lab Control Sample	Total/NA	Water	PFAS	165610
LCSD 320-165610/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	165610

Lab Chronicle

Client: Shannon & Wilson, Inc
Site: Citf oFkairbangs kire Traininp Area

TestAmerica Job ID: 320-2831P-2

Client Sample ID: 168493

Date Collecte/ : 2M54M54- 48:4M

Date Receive/ : 2M54M54- 27:M2

Lab Sample ID: 8120198- MM
x atriW d ater

Prep Type	Batch Type	Batch x etho/	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare/ or Analyze/	Analyst	Lab
Totaly5 A	j reO	j kAS j reO			7400 mL	7466 mL	76P670	0P22y71 7P:P9	TN5	TAL SAC
Totaly5 A	Analf sis	j kAS		7			76P111	0P23y71 7P:P7	S. E	TAL SAC

Laboratory References:

TAL SAC RTestAmerica Sacramento, 880 Ei=ersive j argd af , West Sacramento, CA wP60P, T. L (w76)313-P600

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25381-2

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	70	UST-011	72-75-78
Arizona	State Program	9	AZ0805	05-77-78
Arkansas DEQ	State Program	6	55-0697	06-78-75
California	State Program	9	2598	07-37-75
Colorado	State Program	5	CA00044	05-37-78
Connecticut	State Program	7	PH-0697	06-30-78
Florida	NELAP	4	E58180	06-30-78
Hawaii	State Program	9	N/A	07-29-75
Illinois	NELAP	1	200060	03-78-75
*ansas	NELAP	8	E-70381	70-37-78
L-A-K	DoD ELAP		L2465	07-20-75
Louisiana	NELAP	6	30672	06-30-78
Baine	State Program	7	CA0004	04-75-75
B ichigan	State Program	1	9948	07-37-75
NeMada	State Program	9	CA00044	08-37-78
New Hampshire	NELAP	7	2998	04-75-75
New Jersey	NELAP	2	CA001	06-30-78
New vork	NELAP	2	77666	04-07-75
Yregon	NELAP	70	4040	07-25-75
PennsylMania	NELAP	3	65-07282	03-37-75
TeQas	NELAP	6	T704804399	01-37-75
US Fish & Wildlife	Federal		LE745355-0	70-37-78
USDA	Federal		P330-77-00436	72-30-78
USEPA UCB x	Federal	7	CA00044	77-06-75
Utah	NELAP	5	CA00044	02-25-75
Rirginia	NELAP	3	460285	03-74-75
Washington	State Program	70	C157	01-01-75
West Rirginia (DW)	State Program	3	9930C	72-37-78
Wyoming	State Program	5	5TB S-L	07-29-78 V

VAccreditation/Certification renewal pending - accreditation/certification considered Valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25381-2

Method	Method Description	Protocol	Laboratory
PFAS	Perfluorinated Alkyl Substances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

TAL SAC = TestAmerica Sacramento, 550 Riverside Parkway, West Sacramento, CA 91601, TEL (916) 673-8316

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28375-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-28375-2	263184	Water	05/15/17 13:15	05/18/17 09:50

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test America
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735</u>		Total Number of Containers: <u>2</u>		Signature: _____ Time: <u>9:22</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>Co F Reg Fire Tr Co</u>		COC Seals/Intact? Y/N/NA <u>—</u>		Printed Name: _____ Date: <u>03/16/17</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN</u>		Received Good Cond./Cold <u>—</u>		Company: <u>Craig Beebe</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>Fed Ex</u>		Company: <u>Shannon + Wilson</u>		Company: _____		Company: _____	
Sampler: <u>CAB</u>		(attach shipping bill, if any)							
Instructions									
Requested Turnaround Time: <u>Standard</u>									
Special Instructions: <u>Please bill to:</u> <u>31-1-11735-009</u>									
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File									

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-28375-2

Login Number: 28375

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity as measured by a survey meter	1 rue	
The cooler's custody seal, if present, is intact	1 rue	
Sample custody seals, if present, are intact	No	
The cooler or sample has not appeared to have been compromised	1 rue	
Sample were refrigerated	1 rue	
Cooler temperature is acceptable	1 rue	
Cooler temperature is recorded	1 rue	
CAC is present	1 rue	
CAC is filled out in an appropriate	1 rue	
CAC is filled out with all pertinent information	1 rue	
Is the QR Sample name present on CAC	1 rue	
There are no discrepancies between the containers received and the CAC	1 rue	
Samples are received within 15 minutes of collection	1 rue	
Sample containers have legible labels	1 rue	
Containers are not broken or leaking	1 rue	
Sample collection dates are recorded	1 rue	
Properly stored sample containers are used	1 rue	
Sample bottles are completely filled	1 rue	
Sample preservation Period	No	
There is sufficient volume for all requested analyses, including requested S&M	1 rue	
Containers received have no headspace or bubble is less than 4mm	1 rue	
Quality control samples are not present	1 rue	
Samples do not require settling or centrifuging	1 rue	
Tested Chlorine Check	No	

Laboratory Data Review Checklist

Completed by:

Marcy Nadel

Title:

Geologist

Date:

May 26, 2017

CS Report Name:

City of Fairbanks Fire
Training Area

Report Date:

May 26, 2017

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica, Inc.

Laboratory Report Number:

320-28375-2

ADEC File Number:

102.38.182

Hazard Identification Number:

26309

1. Laboratory

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

☒ Yes ☐ No

Comments:

ADEC has not approved an analytical laboratory for analysis of PFCs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☒ Yes ☐ No

Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes ☐ No

Comments:

- b. Correct analyses requested?

☒ Yes ☐ No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

☒ Yes ☐ No

Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒ Yes ☐ No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No

Comments:

N/A; there were no discrepancies reported by the laboratory.

- e. Data quality or usability affected?

Comments:

The data quality and usability were unaffected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

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

☒ Yes ☐ No

Comments:

The laboratory notes that the samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory was 5.9° C.

The laboratory notes that there was sediment present in water sample 263184.

The laboratory notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batch 165610.

- c. Were all corrective actions documented?

☒ Yes ☐ No

Comments:

A laboratory control sample (LCS) and LCS duplicate (LCSD) were extracted with this batch to demonstrate laboratory accuracy and precision.

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

Comments:

The laboratory did not specify 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:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met.

c. All soils reported on a dry weight basis?

☐ Yes ☒ No

Comments:

Soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No

Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were 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:

iii. If above LOQ, what samples are affected?

Comments:

N/A; PFCs were not detected in MB 320-165610/1-A.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

LCS/LCSD sample results were reported.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☒ No

Comments:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No

Comments:

Percent recoveries were within the ranges required by the laboratory method.

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:

The RPDs were within laboratory limits. The maximum RPD was 7%.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

vii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No Comments:

Percent recoveries for surrogates are within the laboratory limits.

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

☐ Yes ☒ No Comments:

Qualification of the results was not required; see above.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No Comments:

PFCs are not volatile compounds so a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this WO.

v. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

e. Field Duplicate

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

☒ Yes ☐ No

Comments:

A field-duplicate pair was not submitted with the one sample in this WO. However, field duplicates are submitted at the appropriate frequency for the overall project.

ii. Submitted blind to lab?

☒ Yes ☐ No

Comments:

N/A; a field-duplicate pair was not submitted with this WO.

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:

A field-duplicate pair was not submitted with this WO. The results are considered unaffected.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

☐ Yes ☐ No ☒ Not Applicable

i. All results less than LOQ?

☐ Yes ☒ No

Comments:

An equipment blank was not submitted with this WO. Reusable equipment was not utilized during sample collection; an equipment blank is not required.

ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☒ No

Comments:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-28929-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

6/20/2017 1:19:57 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28929-1

Qualifiers

LCMS

Qualifier	Qualifier Description
-----------	-----------------------

J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
---	--

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
--------------	---

α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project Site: City of Airborne Fire Training Area

TestAmerica Job ID: 320-27626-4

Job ID: 320-28929-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-28929-1

Receipt

The samples were received on 07/20/17 at 6:30 AM; the samples arrived in coolers, properly preserved and, as required, on ice. The temperature of the cooler at receipt was 2.05°C.

LCMS

Methox(WS-) C-002z Att4: The samples were analyzed by the in-line SoliV 1 phase Fraction method using TestAmerica Sacramento Standard Reference Material (SRM) (WS-) C-002z "ew 2.NG er- and 1 ol/ yuorinatev Substances "1f AS(in Water, Soils, Sediments and TissueG

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

Organic Prep

Methox(1f AS 1reg: There is sediment present in the sample ink samples. 4d72Nd °320-27626-4(and 4d9797 °320-27626-2(

Methox(1f AS 1reg: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MSJMSD) (associated with preparation batch 320-4d7767.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25727-1

Client Sample ID: 407290

- aL Sample ID: b2362712164

Mnalyte	8 eAut s ualiQer	8 -	RD- f nit	Dil Uac D	RetFoh	drep Pype
Perfluorobutanesulfonic acid (PFBS)	13	2N	0N2 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorohe4anesulfonic acid (PF64S)	35	2N	0N8 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorohexanoic acid (PF6xA)	Hp	2N	0N0 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorooctanoic acid (PFOA)	Hl	2N	0N8 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorooctanesulfonic acid (PFOS)	pp	2N	1N3 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorononanoic acid (PF9A)	220	2N	0N8 ng/.	1	WS-. C-002L Att1	Total/9 A

Client Sample ID: 40777

- aL Sample ID: b2362712162

Mnalyte	8 eAut s ualiQer	8 -	RD- f nit	Dil Uac D	RetFoh	drep Pype
Perfluorohe4anesulfonic acid (PF64S)	5N	2N	0N8 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorohexanoic acid (PF6xA)	0Np J	2N	0N0 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorooctanoic acid (PFOA)	3N	2N	0N8 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorooctanesulfonic acid (PFOS)	15	2N	1N3 ng/.	1	WS-. C-002L Att1	Total/9 A
Perfluorononanoic acid (PF9A)	0N2 J	2N	0N8 ng/.	1	WS-. C-002L Att1	Total/9 A

This Detection Summary does not include radiochemical test resultsN

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28929-1

Client Sample ID: 168276

Date Collected: 06/06/17 12:28

Date Received: 06/08/17 09:30

Lab Sample ID: 320-28929-1

4 at 1000 : x at 1000

4 ethylhexylbenzene S-LC-002P Ftt1 - AemluWWhatec Fkyl Substances

Conc	Result	Qualifier	RL	4 DL	z nit	D	AMpaMc	F nalyJec	Dil Bao
AemluWWhbutanesulfWhio aoic (AB) S.	13		2.0	0.92	ng/L		06/12/17 14:36	06/14/17 01:27	1
AemluWWhher anesulfWhio aoic (ABQr S.	38		2.0	0.87	ng/L		06/12/17 14:36	06/14/17 01:27	1
AemluWWhheptanWo aoic (ABQpF.	716		2.0	0.80	ng/L		06/12/17 14:36	06/14/17 01:27	1
AemluWWhbtanWo aoic (ABOF.	71		2.0	0.75	ng/L		06/12/17 14:36	06/14/17 01:27	1
AemluWWhbtanesulfWhio aoic (ABOS.	66		2.0	1.3	ng/L		06/12/17 14:36	06/14/17 01:27	1
AemluWWhWhanWo aoic (AB5 F.	220		2.0	0.65	ng/L		06/12/17 14:36	06/14/17 01:27	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	80		24 514-	- / 012010 1: 30	- / 01: 010 - 1320	1
1Qp: PFHA9	N		24 514-	- / 012010 1: 30	- / 01: 010 - 1320	1
1Qp: PFO9	88		24 514-	- / 012010 1: 30	- / 01: 010 - 1320	1
1Qp: PFOS	08		24 514-	- / 012010 1: 30	- / 01: 010 - 1320	1
1Qp 4 PF79	8:		24 514-	- / 012010 1: 30	- / 01: 010 - 1320	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28929-1

Client Sample ID: 16/ 8/ 8

Date Collected: 06/06/17 16:00

Date Received: 06/08/17 09:30

Lab Sample ID: 320-28929-2

4 at 1000 : x at 1000

4 ethylhexylbenzene (EHF) - Aromatic Hydrocarbon (AHC) Substances

Sample	Result	Qualifier	RL	4 DL	z nit	D	AMPA	Sample	Dil
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/12/17 14:36	06/14/17 01:45	1
Aromatic Hydrocarbon (AHC)	8H		2.0	0.87	ng/L		06/12/17 14:36	06/14/17 01:45	1
Aromatic Hydrocarbon (AHC) (ABQr S.)	0.86	N	2.0	0.80	ng/L		06/12/17 14:36	06/14/17 01:45	1
Aromatic Hydrocarbon (AHC) (ABOF .)	3HP		2.0	0.75	ng/L		06/12/17 14:36	06/14/17 01:45	1
Aromatic Hydrocarbon (AHC) (ABOS.)	18		2.0	1.3	ng/L		06/12/17 14:36	06/14/17 01:45	1
Aromatic Hydrocarbon (AHC) (AB5 F.)	0.82	N	2.0	0.65	ng/L		06/12/17 14:36	06/14/17 01:45	1
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac		
18O2 PFHxS	80		24 514-	- / 01/20/10 1:30	- / 01/20/10 - 13 4			1	
1Q: PFHA9	NH		24 514-	- / 01/20/10 1:30	- / 01/20/10 - 13 4			1	
1Q: PFO9	NH		24 514-	- / 01/20/10 1:30	- / 01/20/10 - 13 4			1	
1Q: PFOS	8C		24 514-	- / 01/20/10 1:30	- / 01/20/10 - 13 4			1	
1Q: 4 PF79	NH		24 514-	- / 01/20/10 1:30	- / 01/20/10 - 13 4			1	

TestAmerica Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25727-1

Method: P SFA- F f kb c ttT F/ erNuorinated c lxyl SuWstanLes

Matri5: P ater

/ rep Cype: Cotal(2 c

		/ erLent Isotope Dilution ReLovery 1c LLeptanLe Aimits0				
		18 k / CH5 3- 4/ CHp 3- 4 / O8 c 3- 4 / O8 3- b / O2 c	1kbFTbf 0	1kbFTbf 0	1kbFTbf 0	1kbFTbf 0
AaWSample ID	- lient Sample ID					
320-25727-1	145264		59	74	55	95
320-25727-2	149595		59	78	71	53
LCS 320-145575/2-A	Lab Control Sample		55	79	59	54
LCSD 320-145575/3-A	Lab Control Sample Dup		52	57	53	51
MB 320-145575/1-A	Method Blank		51	57	51	51

Surrogate Aegend

15O2 PFHxS = 15O2 PFHxS
13C6-PFHpA = 13C6-PFHpA
13C6 PFOA = 13C6 PFOA
13C6 PFOS = 13C6 PFOS
13C8 PFNA = 13C8 PFNA

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25727-1

Method: WS-LC-0025 Att1 - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-168898/1-A

Matrix: Water

Analysis Batch: 169187

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 168898

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.72	ng/9		0L/12/14 16:3L	0L/13/14 20:33	1
Perfluoroheptanesulfonic acid (PFx 8S)	ND		2.0	0.54	ng/9		0L/12/14 16:3L	0L/13/14 20:33	1
Perfluoroheptanoic acid (PFx HA)	ND		2.0	0.50	ng/9		0L/12/14 16:3L	0L/13/14 20:33	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.4p	ng/9		0L/12/14 16:3L	0L/13/14 20:33	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/9		0L/12/14 16:3L	0L/13/14 20:33	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.Lp	ng/9		0L/12/14 16:3L	0L/13/14 20:33	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	81		20 4105	5-/12/1: 1C36-	5-/16/1: 25366	1
16ACPFH9N	8p		20 4105	5-/12/1: 1C36-	5-/16/1: 25366	1
16ACPFON	81		20 4105	5-/12/1: 1C36-	5-/16/1: 25366	1
16ACPFOS	81		20 4105	5-/12/1: 1C36-	5-/16/1: 25366	1
16A0 PF7N	86		20 4105	5-/12/1: 1C36-	5-/16/1: 25366	1

Lab Sample ID: LCS 320-168898/2-A

Matrix: Water

Analysis Batch: 169187

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 168898

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	14.4	20.6		ng/9		11p	pp - 164
Perfluoroheptanesulfonic acid (PFx 8S)	15.2	21.0		ng/9		11p	p5 - 135
Perfluoroheptanoic acid (PFx HA)	20.0	23.4		ng/9		115	L3 - 13p
Perfluorooctanoic acid (PFOA)	20.0	22.5		ng/9		116	L3 - 161
Perfluorooctanesulfonic acid (PFOS)	15.L	20.6		ng/9		110	64 - 1L2
Perfluorononanoic acid (PFNA)	20.0	21.L		ng/9		105	41 - 160

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	88		20 4105
16ACPFH9N	p:		20 4105
16ACPFON	8:		20 4105
16ACPFOS	8-		20 4105
16A0 PF7N	p2		20 4105

Lab Sample ID: LCSD 320-168898/3-A

Matrix: Water

Analysis Batch: 169187

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 168898

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	14.4	21.4		ng/9		123	pp - 164	L	30
Perfluoroheptanesulfonic acid (PFx 8S)	15.2	22.6		ng/9		123	p5 - 135	L	30
Perfluoroheptanoic acid (PFx HA)	20.0	2p.2		ng/9		12L	L3 - 13p	L	30
Perfluorooctanoic acid (PFOA)	20.0	23.p		ng/9		114	L3 - 161	3	30
Perfluorooctanesulfonic acid (PFOS)	15.L	21.L		ng/9		114	64 - 1L2	L	30
Perfluorononanoic acid (PFNA)	20.0	23.3		ng/9		114	41 - 160	5	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc

Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25727-1

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
18O2 PFHxS	82		20 4105
16ACPFH9N	8p		20 4105
16ACPFON	86		20 4105
16ACPFOS	81		20 4105
16A0 PF7N	8C		20 4105

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QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-28929-1

LCMS

Prep Batch: 168898

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28929-1	168246	Total/NA	Water	PFAS Prep	
320-28929-2	167878	Total/NA	Water	PFAS Prep	
MB 320-168898/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-168898/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-168898/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 169187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-28929-1	168246	Total/NA	Water	WS-LC-0025 Att1	168898
320-28929-2	167878	Total/NA	Water	WS-LC-0025 Att1	168898
MB 320-168898/1-A	Method Blank	Total/NA	Water	WS-LC-0025 Att1	168898
LCS 320-168898/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 Att1	168898
LCSD 320-168898/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 Att1	168898

Lab Chronicle

Client: Shannon & Wilson, Inc
 j ro/ectySite: Citf oFkairbangs kire Traininp Area

TestAmerica Job ID: 320-28121-P

Client Sample ID: 168496
Date Collected: 26/26/15 14:48
Date Received: 26/28/15 2- :32

Lab Sample ID: 342048- 4- 01
Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	Rsn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAt	Lab
Totaly5 A	j reO	j kAS j reO			P400 m6	P477 m6	P78818	07yP2yP9 PL:37	TN5	TA6 SAC
Totaly5 A	Analf sis	WS-6C-002. AttP		P			P71P89	07yPLyP9 0P:29	SER	TA6 SAC

Client Sample ID: 165858
Date Collected: 26/26/15 16:N2
Date Received: 26/28/15 2- :32

Lab Sample ID: 342048- 4- 04
Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	Rsn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTAt	Lab
Totaly5 A	j reO	j kAS j reO			P400 m6	P477 m6	P78818	07yP2yP9 PL:37	TN5	TA6 SAC
Totaly5 A	Analf sis	WS-6C-002. AttP		P			P71P89	07yPLyP9 0P:L	SER	TA6 SAC

LaboratorT ReferenceA:

TA6 SAC = TestAmerica Sacramento, 880 Riverside j argwaf , West Sacramento, CA 1. 70. , TE6 (1P7)393-. 700

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25828-1

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-077	12-15-1z
Arizona	State Program	8	AZ0z05	05-11-15
Arkansas DEQ	State Program	6	55-0681	06-1z-15
California	State Program	8	258z	01-31-15
Colorado	State Program	5	CA00044	05-31-1z
Connecticut	State Program	1	PH-0681	06-30-18
Florida	NELAP	4	E5z7z0	06-30-1z
Hawaii	State Program	8	N/A	01-28-15
Illinois	NELAP	7	200060	03-1z-15
Indiana	NELAP	z	E-103z7	10-31-1z
L-A-K	DoD ELAP		L2465	01-20-15
Louisiana	NELAP	6	30612	06-30-1z
Maine	State Program	1	CA0004	04-15-15
Michigan	State Program	7	884z	01-31-15
Minnesota	State Program	8	CA00044	0z-31-1z
New Hampshire	NELAP	1	288z	04-15-15
New Jersey	NELAP	2	CA007	06-30-1z
New York	NELAP	2	11666	04-01-15
Oregon	NELAP	10	4040	01-25-15
Pennsylvania	NELAP	3	65-012z2	03-31-15
Texas	NELAP	6	T104z04388	07-31-15
US Fish & Wildlife	Federal		LE145355-0	10-31-1z
USDA	Federal		P330-11-00436	12-30-1z
USEPA UCB x	Federal	1	CA00044	11-06-15
Utah	NELAP	5	CA00044	02-25-15
Virginia	NELAP	3	4602z5	03-14-15
Washington	State Program	10	C751	07-07-15
West Virginia (DW)	State Program	3	8830C	12-31-1z
Wyoming	State Program	5	5TB S-L	01-28-1z V

VAccreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25828-1

Method	Method Description	Protocol	Laboratory
WS-LC-002u Att1	Perflorinate= Alkyl Sdbstances	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC OTestAmerica Laboratories, West Sacramento, Facility Stan=ar= p . erating Proce=dreR

Laboratory References:

TAL SAC OTestAmerica Sacramento, 550 v iwersi=e Park9 ay, West Sacramento, CA 8u60u, TEL (816)373-u600

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-25828-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-25828-1	165246	Water	06/06/17 12:25	06/05/17 08:30
320-25828-2	167575	Water	06/06/17 16:90	06/05/17 08:30

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test America
Attn: David Alltucker

Analysis Parameters/Sample Container Description
(include preservative if used)

[illegible]

320-28929 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: 31-1-11735		Total Number of Containers		Signature: Craig Beebe Time: 09:55		Signature: Time:		Signature: Time:	
Project Name: GFR, Fire Tr. Co.		COC Seals/Intact? Y/N/NA		Printed Name: Craig Beebe Date: 6/7/2017		Printed Name: Date:		Printed Name: Date:	
Contact: MDN		Received Good Cond./Cold		Company: Shannon & Wilson, Inc.		Company:		Company:	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method:							
Sampler: CAB		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: Standard				Signature: [Signature] Time: 9:30		Signature: Time:		Signature: Time:	
Special Instructions: Please bill to 31-1-11735-009				Printed Name: Alonso Ascuayo Date: 6/8/17		Printed Name: Date:		Printed Name: Date:	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - lab files				Company: TAWG 2.0°C		Company:		Company:	

No. 34566

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-25828-1

Login Number: 28929

List Source: TestAmerica Sacramento

List Number: 1

Creator: Turpen, Troy

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

Laboratory Data Review Checklist

Completed by:

Craig Beebe

Title:

Geologist

Date:

June 21, 2017

CS Report Name:

City of Fairbanks Fire
Training Area

Report Date:

June 20, 2017

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica, Inc.

Laboratory Report Number:

320-28929

ADEC File Number:

102.38.182

Hazard Identification Number:

26309

1. Laboratory

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

☒ Yes ☐ No

Comments:

ADEC has not approved an analytical laboratory for analysis of PFCs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☒ Yes ☐ No

Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes ☐ No

Comments:

- b. Correct analyses requested?

☒ Yes ☐ No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

☒ Yes ☐ No

Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No

Comments:

Analysis of PFCs does not require a preservative other than temperature control.

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

☒ Yes ☐ No

Comments:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No

Comments:

N/A; there were no discrepancies reported by the laboratory.

- e. Data quality or usability affected?

Comments:

The data quality and usability were unaffected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

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

☒ Yes ☐ No

Comments:

The following case narrative notes relate to samples in this work order (WO).

The laboratory notes that the samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory was 2.0° C.

There laboratory notes that there was sediment present in samples 168246 and 167878.

The laboratory notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batch 168898.

- c. Were all corrective actions documented?

☒ Yes ☐ No

Comments:

A laboratory control sample (LCS) and LCS duplicate (LCSD) were extracted with this batch to demonstrate laboratory accuracy and precision.

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

Comments:

The laboratory did not specify 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:

Soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes

☐ No

Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were 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:

iii. If above LOQ, what samples are affected?

Comments:

N/A; PFCs were not detected in MB 320-168898/1-A.

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

☐ Yes

☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

LCS/LCSD sample results were reported for analysis of PFCs.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☒ No Comments:

Metals and inorganics were not analyzed as part of this work order.

- iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No Comments:

- iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No Comments:

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☒ No Comments:

Qualification of the results was not required; see above.

- vii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

c. Surrogates – Organics Only

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

☒ Yes ☐ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No Comments:

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

☐ Yes ☒ No Comments:

There were no surrogate recovery failures; therefore, qualification of the results was not required.

- iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No Comments:

PFCs are not volatile compounds so a trip blank is not required.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

- iii. All results less than LOQ?

☐ Yes ☒ No Comments:

N/A; a trip blank is not required.

- iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this WO.

- v. Data quality or usability affected?

Comments:

None; a trip blank was not submitted with this WO.

e. Field Duplicate

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

☒ Yes ☐ No

Comments:

A field-duplicate pair was not submitted with the two samples in this WO. However, field duplicate samples are submitted at the appropriate frequency for the overall project.

- ii. Submitted blind to lab?

☐ Yes ☒ No

Comments:

N/A; a field-duplicate pair was not submitted with this WO.

- iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☐ Yes ☒ No

Comments:

N/A; a field-duplicate pair was not submitted with this WO.

- iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

☐ Yes ☐ No ☒ Not Applicable

- i. All results less than LOQ?

☐ Yes ☒ No

Comments:

An equipment blank was not submitted with this WO. Reusable equipment was not utilized during sample collection; an equipment blank is not required.

- ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☒ No

Comments:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-29312-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

7/5/2017 11:51:47 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-29312-1

Qualifiers

LCMS

Qualifier	Qualifier Description
-----------	-----------------------

J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
---	--

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
--------------	---

α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-29312-1

Job ID: 320-29312-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-29312-1

Receipt

The samples were received on 6/22/2017 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 10.1° C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria at 10.1 degrees: 483826 (320-29312-1) and 483926 (320-29312-2). Samples were received on melted thawed gel packs. The client was contacted and the lab instructed to proceed.

LCMS

Method(s) WS-LC-0025 At1: The samples were analyzed by the in-line SPE method following TestAmerica Sacramento's Standard Operating Procedure (SOP), WS-LC-0025 Rev. 2.4 "Per- and Polyfluorinated Substances (PFAS) in Water, Soils, Sediments and Tissue":

Method(s) WS-LC-0025 At1: The Isotope Dilution Analyte (IDA) recoveries associated with these continuous calibration verification (CCV) samples (CCV) are below the method recommended limit. IDA recoveries are in control in the associated samples in addition to the previous CCV sample. Moreover, native recoveries are in control in the impacted CCV; therefore, there is no adverse impact in the samples.

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

Organic Prep

Method(s) PFAS Prep: The following samples were decanted prior to extraction due to sediment present. 483826 (320-29312-1) and 483926 (320-29312-2)

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-171768.

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

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-29312-1

Client Sample ID: 483826

Lab Sample ID: 320-29312-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.7	J	2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.0		2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.7		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.9		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: 483926

Lab Sample ID: 320-29312-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.6	J	2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.2		2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.9		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-29312-1

Client Sample ID: 843429

Date Collected: 09/20/15 13:84

Date Received: 09/22/15 06:30

Lab Sample ID: 320-26312-1

Matrix: Water

Met7od: WS-LC-002h Pt1 - FerAuorinated Plf kl Substances

Pnalkte	Result	Qualifier	RL	MDL	Hnit	D	Prepared	PnalkQed	Dil (ac
FerAuorobutanesulonic acid yF (BS)	15	U	2.0	0.92	ng/L		06/29/17 15:29	06/30/17 12:55	1
FerAuoro7exanesulonic acid yF (OxS)	40		2.0	0.87	ng/L		06/29/17 15:29	06/30/17 12:55	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/29/17 15:29	06/30/17 12:55	1
FerAuorooctanoic acid yF (J P)	35		2.0	0.75	ng/L		06/29/17 15:29	06/30/17 12:55	1
FerAuorooctanesulonic acid yF (J S)	36		2.0	1.3	ng/L		06/29/17 15:29	06/30/17 12:55	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/29/17 15:29	06/30/17 12:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	128		20 4105				5-/26/1: 1036	5-/C5/1: 1230	1
1Qp A PFH9N	12:		20 4105				5-/26/1: 1036	5-/C5/1: 1230	1
1Qp A PFON	15-		20 4105				5-/26/1: 1036	5-/C5/1: 1230	1
1Qp A PFOS	11A		20 4105				5-/26/1: 1036	5-/C5/1: 1230	1
1Qp 0 PF7N	80		20 4105				5-/26/1: 1036	5-/C5/1: 1230	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-29312-1

Client Sample ID: 843629

Date Collected: 09/20/15 13:h0

Date Received: 09/22/15 06:30

Lab Sample ID: 320-26312-2

Matrix: Water

Met7od: WS-LC-002h Pt1 - FerAuorinated Plf kl Substances

Pnalkte	Result	Qualifier	RL	MDL	Hnit	D	Prepared	PnalkQed	Dil (ac
FerAuorobutanesulonic acid yF (BS)	129	U	2.0	0.92	ng/L		06/29/17 15:29	06/30/17 13:32	1
FerAuoro7exanesulonic acid yF (OxS)	42		2.0	0.87	ng/L		06/29/17 15:29	06/30/17 13:32	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/29/17 15:29	06/30/17 13:32	1
FerAuorooctanoic acid yF (J P)	36		2.0	0.75	ng/L		06/29/17 15:29	06/30/17 13:32	1
FerAuorooctanesulonic acid yF (J S)	36		2.0	1.3	ng/L		06/29/17 15:29	06/30/17 13:32	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/29/17 15:29	06/30/17 13:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	126		20 4105				5-/26/1: 1036	5-/C5/1: 1C32	1
1Qp A PFH9N	12-		20 4105				5-/26/1: 1036	5-/C5/1: 1C32	1
1Qp A PFON	15A		20 4105				5-/26/1: 1036	5-/C5/1: 1C32	1
1Qp A PFOS	11A		20 4105				5-/26/1: 1036	5-/C5/1: 1C32	1
1Qp 0 PF7N	8A		20 4105				5-/26/1: 1036	5-/C5/1: 1C32	1

TestAmerica Sacramento

Method: P SFA- F f kb ctT F/ erNuorinated c lxyl SuWstanLes

Matri5: P ater

/ rep Cype: Cotal(2 c

		/ erLent Isotope Dilution ReLovery 1c LLeptanLe Aimits0				
		18 k / OH5	3- 4/ OHp	3- 4 / O8 c	3- 4 / O8 f	3- b / O2 c
AaWSample ID	- lient Sample ID	1kbFTbf 0	1kbFTbf 0	1kbFTbf 0	1kbFTbf 0	1kbFTbf 0
320-25372-7	6g3g24	72g	729	704	776	g8
320-25372-2	6g3524	725	724	706	776	g6
L1 n 320-79794gj2-A	Lab 1 ol troQhamp@	704	708	g8	53	96
L1 nD 320-79794gj3-A	Lab 1 ol troQhamp@ Dup	777	777	57	59	95
MB 320-79794gj7-A	MetSod B@l F	705	709	g9	56	92

Surrogate Aegend

$$7gO_2, f H_{xn} = 7gO_2, f H_{xn}$$

731 6-, f HpA = 731 6-, f HpA

$$7316, f_{OA} = 7316, f_{OA}$$
$$7316, f_{On} = 7316, f_{On}$$
$$7318, f_{NA} = 7318, f_{NA}$$

QC Sample Results

1 Cell: nSal l ol h & iSol Wl c
 , rolectjnite: 1 it/ oyf airbal Fs f ire Trail il k Area

TestAmerica Job ID: 320-25372-7

Method: WS-LC-0025 At1 - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-161689/1-A

Matrix: Water

Analysis Batch: 161750

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 161689

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
, ery@orobgtal esg@ol ic aciu d f (nB	) D		2N	0N52	I kj.		09j25j7L 74:25	09j30j7L 70:70	7
, ery@oroSe8al esg@ol ic aciu d f x 8nB	) D		2N	0N6L	I kj.		09j25j7L 74:25	09j30j7L 70:70	7
, ery@oroSeHtal oic aciu d f x HAB	) D		2N	0N60	I kj.		09j25j7L 74:25	09j30j7L 70:70	7
, ery@oroOctal oic aciu d f p AB	) D		2N	0N4	I kj.		09j25j7L 74:25	09j30j7L 70:70	7
, ery@oroOctal esg@ol ic aciu d f p nB	) D		2N	7N3	I kj.		09j25j7L 74:25	09j30j7L 70:70	7
, ery@orol ol al oic aciu d f) AB	) D		2N	0N4	I kj.		09j25j7L 74:25	09j30j7L 70:70	7

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		25 - 150	0/ 0240/3 15Q4	0/ 0 00/3 10Q0	1
1: p A-PFH9N	103		25 - 150	0/ 0240/3 15Q4	0/ 0 00/3 10Q0	1
1: p APFON	83		25 - 150	0/ 0240/3 15Q4	0/ 0 00/3 10Q0	1
1: p APFOS	4A		25 - 150	0/ 0240/3 15Q4	0/ 0 00/3 10Q0	1
1: p 5 PF7N	32		25 - 150	0/ 0240/3 15Q4	0/ 0 00/3 10Q0	1

Lab Sample ID: LCS 320-161689/2-A

Matrix: Water

Analysis Batch: 161750

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 161689

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
, ery@orobgtal esg@ol ic aciu d f (nB	7LNL	75NL		I kj.		777	L2 - 747
, ery@oroSe8al esg@ol ic aciu d f x 8nB	76N2	79NL		I kj.		52	L3 - 74L
, ery@oroSeHtal oic aciu d f x HAB	20N	76N5		I kj.		54	L7 - 736
, ery@oroOctal oic aciu d f p AB	20N	75ND		I kj.		5L	L0 - 700
, ery@oroOctal esg@ol ic aciu d f p nB	76N9	79NL		I kj.		50	95 - 700
, ery@orol ol al oic aciu d f) AB	20N	75N9		I kj.		56	L3 - 7QL

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	10/		25 - 150
1: p A-PFH9N	105		25 - 150
1: p APFON	85		25 - 150
1: p APFOS	4:		25 - 150
1: p 5 PF7N	3A		25 - 150

Lab Sample ID: LCSD 320-161689/3-A

Matrix: Water

Analysis Batch: 161750

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 161689

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
, ery@orobgtal esg@ol ic aciu d f (nB	7LNL	75ND		I kj.		770	L2 - 747	7	30
, ery@oroSe8al esg@ol ic aciu d f x 8nB	76N2	79N3		I kj.		50	L3 - 74L	2	30
, ery@oroSeHtal oic aciu d f x HAB	20N	76ND		I kj.		52	L7 - 736	3	30
, ery@oroOctal oic aciu d f p AB	20N	76N9		I kj.		50	L0 - 700	6	30
, ery@oroOctal esg@ol ic aciu d f p nB	76N9	79N4		I kj.		65	95 - 700	7	30
, ery@orol ol al oic aciu d f) AB	20N	7LNL		I kj.		65	L3 - 7QL	70	30

TestAmerica nacramel to

QC Sample Results

TestAmerica Job ID: 320-25372-7

100% of the total sample is recovered

, recovery: 100% of the total sample is recovered

LCSD		LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	111		25 - 150
1: p A-PFH9N	111		25 - 150
1: p A-PFON	41		25 - 150
1: p A-PFOS	43		25 - 150
1: p 5 PF7N	34		25 - 150

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TestAmerica nacranel to

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-29312-1

LCMS

Prep Batch: 171768

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-29312-1	483826	Total/NA	Water	PFAS Prep	
320-29312-2	483926	Total/NA	Water	PFAS Prep	
MB 320-171768/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-171768/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-171768/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 171950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-29312-1	483826	Total/NA	Water	WS-LC-0025 At1	171768
320-29312-2	483926	Total/NA	Water	WS-LC-0025 At1	171768
MB 320-171768/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	171768
LCS 320-171768/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	171768
LCSD 320-171768/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	171768

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-29312-1

Client Sample ID: 168649

Date Collected: 39/43/- 5 - 8:16

Date Received: 39/44/- 5 30:83

Lab Sample ID: 8432408- 42

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	Rsn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	171768	06/29/17 15:29	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			171950	06/30/17 12:55	SER	TAL SAC

Client Sample ID: 168049

Date Collected: 39/43/- 5 - 8:16

Date Received: 39/44/- 5 30:83

Lab Sample ID: 8432408- 42

Matrix: Water

Brep 7Tpe	yatch 7Tpe	yatch Method	Rsn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	Brepared or PnalTued	PnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	171768	06/29/17 15:29	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			171950	06/30/17 13:32	SER	TAL SAC

LaboratorT ReferenceA:

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

TestAmerica Job ID: 320-25312-1

Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory/ are listed. All accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State 7 program	10	9ST-099	12-18-1E
Arizona	State 7 program	5	AU0E08	08-11-1E
Arkansas	State 7 program	2	88-0Z51	0Z-1E-18
California	State 7 program	5	285E	01-31-18
Colorado	State 7 program	8	CA000QQ	08-31-1E
Connecticut	State 7 program	1	74 -0Z51	0Z-30-15
Delaware	State 7 program	Q	98E9E0	0Z-30-18
Florida	State 7 program	Q	djA	01-25-18
Hawaii	State 7 program	5	djA	01-25-18
Illinois	State 7 program	9	2000Z0	03-1E-18
Indiana	State 7 program	E	9-103E9	10-31-1E
Iowa	State 7 program		u2QZ8	01-20-18
Kansas	State 7 program	Z	30Z12	0Z-30-18
Louisiana	State 7 program	1	CA000Q	0Q-18-18
Maine	State 7 program	9	55QE	01-31-18
Maryland	State 7 program	5	CA000QQ	0E-31-1E
Massachusetts	State 7 program	1	255E	0Q-18-18
Michigan	State 7 program	2	CA009	0Z-30-18
Minnesota	State 7 program	2	11ZZZ	0Q-01-18
Mississippi	State 7 program	10	QQQ	01-28-18
Missouri	State 7 program	3	Z8-012E2	03-31-18
Montana	State 7 program	Z	T10QE0QB55	09-31-18
Nebraska	State 7 program		u) 1QB388-0	10-31-1E
Nevada	State 7 program		7330-11-00QBZ	12-30-1E
New Hampshire	State 7 program	1	CA000QQ	11-0Z-18
New Jersey	State 7 program	8	CA000QQ	02-28-18
New Mexico	State 7 program	3	QZ02E8	03-1Q-18
New York	State 7 program	10	C981	09-09-18
North Carolina	State 7 program	3	5530C	12-31-1E
North Dakota	State 7 program	8	8TB S-u	01-25-1E V

VAccreditation|Certification renewal . engink - accreditation|certification considered MalicG

TestAmerica Sacramento

Method Summary

1. Objective: To determine the effect of the test material on the growth of the test organism.

2. Test Material: 1.0% w/v of the test material in the test medium.

TestAmerica Job ID: 320-25382-8

Method	Method Description	Protocol	Laboratory
Tag-nA1-002L At8	erythrocyte sedimentation rate (ESR) test	Tag-nA1	Tag-nA1

Protocol References:

Tag-nA1 = TestAmerica laboratories, West Sacramento, CA, USA. Standard Operating Procedure.

Laboratory References:

Tag-nA1 = TestAmerica laboratories, West Sacramento, CA, USA. Standard Operating Procedure (586)373-L600

TestAmerica laboratories

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-29312-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-29312-1	483826	Water	06/20/17 13:48	06/22/17 09:30
320-29312-2	483926	Water	06/20/17 13:50	06/22/17 09:30

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

2255 S.W. Canyon Road
Portland, OR 97201-2498
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

CHAIN-OF-CUSTODY RECORD

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Analysis Parameters/Sample Container Description
(include preservative if used)

Page 1 of 1
Laboratory Test America
Attn: David Altshuler

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: 31-11735-009		Total Number of Containers: 4		Signature: M. Nadel Time: 10:15		Signature: Time: _____		Signature: Time: _____	
Project Name: CF Ray Fire Tr Cont		COC Seals/Intact? Y/N/NA: -		Printed Name: M. Nadel Date: 6/24/17		Printed Name: Date: _____		Printed Name: Date: _____	
Contact: MDN		Received Good Cond./Cold: -		Company: Shannon & Wilson		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: FedEx							
Sampler: MDN		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: standard				Signature: [Signature] Time: 9:30		Signature: Time: _____		Signature: Time: _____	
Special Instructions: Please bill to 31-11735-009				Printed Name: Alonso Arroyo Date: 6/22/17		Printed Name: Date: _____		Printed Name: Date: _____	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Data - Shannon & Wilson - lab file				Company: Shannon & Wilson		Company: _____		Company: _____	

Client: Shannon & Wilson, Inc

Job Number: 320-29312-1

Login Number: 29312

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	31-1-11735
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	THAWED GEL PACKS
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	10.1
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Laboratory Data Review Checklist

Completed by:

Craig Beebe

Title:

Geologist

Date:

July 05, 2017

CS Report Name:

City of Fairbanks Fire
Training Area

Report Date:

July 05, 2017

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica, Inc.

Laboratory Report Number:

320-29312

ADEC File Number:

102.38.182

Hazard Identification Number:

26309

1. Laboratory

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

☐ Yes ☒ No

Comments:

ADEC has not approved an analytical laboratory for analysis of PFCs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☐ Yes ☒ No

Comments:

Analyses were performed by TestAmerica, Inc. in West Sacramento, California.

2. Chain of Custody (COC)

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

☒ Yes ☐ No

Comments:

- b. Correct analyses requested?

☒ Yes ☐ No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

☐ Yes ☒ No

Comments:

The temperature blank was measured outside the acceptable temperature range (10.1 °C) upon receipt at the TestAmerica laboratory. The laboratory receipt documentation notes that the shipment was delayed in transit; melted gel packs were observed resting over the samples.

- 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:

The sample receipt form notes that the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No

Comments:

Other than the cooler temperature being out of range, no discrepancies were reported in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

Due to the high chemical and biological stability of PFCs, it is unlikely the integrity of the project samples was adversely affected by the high cooler temperature. Analysis of PFCs does not require a preservative. In an e-mail dated August 3, 2015, the ADEC project manager noted that he had spoken with their chemist, who "agrees the high temperature probably would not affect the PFC results."

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

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

☒ Yes ☐ No

Comments:

The laboratory notes that the samples arrived in good condition and properly preserved. However, the temperature of the sample cooler upon receipt at the laboratory was 10.1° C.

The laboratory notes that the isotope dilution analyte (IDA) recoveries associated with the continuous calibration verification (CCV) samples were below the method recommended limit.

The laboratory notes that there was sediment present in samples 483826 and 483926.

The laboratory notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batch 171768.

- c. Were all corrective actions documented?

☒ Yes ☐ No

Comments:

The samples 483826 and 483926 were decanted prior to extraction due to the presence of sediment in the sample volume.

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

Comments:

The laboratory did not specify 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:

Soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes

☐ No

Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than applicable EPA lifetime drinking water health advisory levels and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

The data quality and usability were 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:

iii. If above LOQ, what samples are affected?

Comments:

N/A; PFCs were not detected in MB 320-171768/1-A.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

LCS/LCSD sample were reported for analysis of PFCs.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☒ No

Comments:

Metals and inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No

Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No

Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; the percent recoveries and RPDs were within acceptable limits.

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

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

vii. Data quality or usability affected?

The data quality and usability were not affected.

Comments:

c. Surrogates – Organics Only

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

☒ Yes ☐ No

Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a ¹³C-isotope of each target analyte and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☒ Yes ☐ No

Comments:

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

☐ Yes ☒ No

Comments:

There were no surrogate recovery failures; therefore, qualification of the results was not required.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☐ Yes ☒ No

Comments:

PFCs are not volatile compounds so a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☒ No

Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

☐ Yes ☒ No

Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this WO.

v. Data quality or usability affected?

Comments:

None; a trip blank was not submitted with this WO.

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:

The field-duplicate pair 483826 / 483926 was submitted with 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:

The RPD values derived from the field-duplicate samples were found to be within the recommended DQOs (30% for water samples) for all analytes.

iv. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

☐ Yes ☐ No ☒ Not Applicable

i. All results less than LOQ?

☐ Yes ☒ No

Comments:

An equipment blank was not submitted with this WO. Reusable equipment was not utilized during sample collection; an equipment blank is not required.

ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

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

a. Defined and appropriate?

☐ Yes ☒ No

Comments:

APPENDIX F
BOTTLED WATER RECIPIENTS

This appendix contains personal information. Content has been removed for confidentiality.

APPENDIX G

**IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL/ENVIRONMENTAL REPORT**

Date: July 2017

To: City of Fairbanks
Attn: Jackson Fox

Re: November 2016 to June 2017 Summary Report
Regional Fire Training Center, Fairbanks, AK

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland