

**Summary Report
June to October 2016 Private Well Sampling
City of Fairbanks Regional Fire Training Center
Fairbanks, Alaska**

December 2016



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Submitted To:
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**SUMMARY REPORT
JUNE TO OCTOBER 2016 PRIVATE WELL SAMPLING
CITY OF FAIRBANKS REGIONAL FIRE TRAINING CENTER
FAIRBANKS, ALASKA**

December 9, 2016

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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
Ahtna	Ahtna Engineering Services, LLC
ATDSR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
°C	degrees Celsius
COC	chain of custody
CoF	City of Fairbanks
CUC	College Utilities Corporation
DAI	direct aqueous injection
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
FSW	Fairbanks Sewer and Water
FYSA	Fairbanks Youth Soccer Association
GAC	granular activated carbon
GHSA	Golden Heart Softball Association
GHU	Golden Heart Utilities
IDA	isotope dilution analyte
LDPE	low-density polyethylene
LHA	Lifetime Health Advisory
mg/kg	milligram per kilogram
mg/L	milligram per liter
MRL	Minimal risk level
mV	millivolts
MW	monitoring well
ng	nanogram
ng/L	nanogram per liter
ORP	oxidation reduction potential
PAN	parcel account number
PFAS	perfluoroalkyl substances
PFBS	perfluorobutane sulfonate
PFC	perfluorinated compound
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PHA	Provisional Health Advisory
QA	quality assurance
QC	quality control

RFTC	Regional Fire Training Center
SPE	solid phase injection
TCE	trichloroethylene
TestAmerica	TestAmerica Laboratories, Inc.
TOC	top of casing
UCMR	EPA Unregulated Contaminant Monitoring Rule
USA	Utility Services of Alaska, Inc.
USGS	United States Geological Survey
Vista	Vista Analytical Laboratories
WELTS	Well Log Tracking System
WO	work order
YSI	multiprobe water quality meter

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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 primary objective of the well search and sampling effort was to identify and sample private wells to determine if they have been affected by perfluorinated compound (PFC) groundwater contamination associated with the burn pit at the RFTC. The secondary objective of tasks described herein was to evaluate the potential presence of PFCs in surface water, groundwater monitoring wells (MWs), private and monitoring wells outside our well search areas (i.e., outlier wells), and other media, and to collect quarterly samples from a subset of identified private wells (i.e., quarterly well monitoring network). The RFTC burn pit is considered an active Alaska Department of Environmental Conservation (ADEC) contaminated site, File Number 102.38.182.

This report was prepared for the City of Fairbanks 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 31-2-16864-007 through -014. We understand this report will also be reviewed by the ADEC Contaminated Sites Program. 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.

1.1 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.

We first sampled the RFTC burn pit contents as part of our Phase 1 site investigation in September 2014, and first sampled onsite groundwater in July 2015 as part of our Phase 2 investigation. PFOS was detected at up to 130 nanograms per liter (ng/L) and PFOA at 710 ng/L in the liquid contents sample and its field duplicate sample. Concentrations of PFCs in the five groundwater samples collected from around the burn pit were up to an estimated 550,000 ng/L PFOS and 7,800 ng/L PFOA.

In November 2015, we collected water samples from a private irrigation well 0.2 miles northwest of the RFTC and an Alaska Department of Transportation & Public Facilities (ADOT&PF) MW 0.8 miles northwest of the RFTC. PFCs were detected in samples from both offsite wells but concentrations were higher in MW-507, the ADOT&PF monitoring well on Davis Road. PFOS was detected at up to 63 ng/L and PFOA at up to 21 ng/L in the MW-507 sample and field duplicate sample.

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. Area 1 consisted of the area within one half mile of the RFTC and west of Lathrop Street, plus 30th Avenue to Peger Road. Area 2 consisted of the E.M. Jones Subdivision, a primarily residential area bound by Peger Road to the east, Davis Road to the south, Kiana Street to the west, and Kobuk Avenue to the north. Area 3 consisted of the northwest quadrant between a half- and 1-mile radius of the RFTC. Areas 1 through 3 are discussed in our *February to May 2016 Private Well Sampling Summary Report*, published in August 2016.

We used information obtained from completed *Private Well Inventory Survey Forms* and subsequent conversations with property owners and occupant 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 industrial and outdoor purposes only, such as irrigation or cleaning. These wells are considered non-drinking-water wells.

1.2 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 floodplain generally slopes to the west or northwest by approximately five feet per mile (Nelson, 1978).

The RFTC study area lies within the Lowlands. The lowland subsurface typically consist of interbedded alluvial sand and gravel, covered in some locations by silty overbank deposits. Cobbles may be observed in alluvial sand and gravel. The density of the alluvial soils typically ranges between loose to medium dense. Unconsolidated or loosely consolidated alluvial deposits up to several hundred feet in thickness overlay pelitic schist bedrock, typified by mica schist and garnet-mica schist in the Fairbanks area. Low hills of bedrock flank the Tanana Valley, most notably to the northwest (i.e., Chena Ridge, University Hill, Ester Dome), north, northeast, and east.

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 at time of onsite sampling ranged from approximately 7 feet to 8 feet below ground surface (bgs). Depth to groundwater in other portions of the RFTC study area is presumed to range from approximately 7 to 12 feet 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, most notably snow melt in the upper Tanana River watershed, groundwater may be recharged by both rivers, causing a westerly or northerly flow. Seasonal fluctuations in groundwater levels ranged from 0.2 to 9 feet (USGS, 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. Additionally, proximity to permafrost can result in lower groundwater temperatures and a slower, more viscous flow. A 2011 study of trichloroethylene (TCE) concentrations near Peger and Davis Roads found that small-scale (i.e., less than 1,000-foot) resolution groundwater flow in the proximity of permafrost “diverge[d] from contaminant pathways that might be expected from regional [hydrology] trends.” The study documented channeling and redirection of the TCE plume, and an upward vertical gradient at some locations, in this area of highly variable permafrost distribution (Carlson and Barnes, 2011). The RFTC well search area encompasses the TCE plume referenced in this 2011 study; we have sampled nine of the same groundwater MWs for this project.

1.3 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 indicating the precision of the LHA level, we consider combined concentrations in excess of 65 ng/L to be exceedances of the LHA. The CoF has established this as the level above which action should be taken to reduce exposure in drinking water.

The CoF was notified of the new LHA level on May 19, 2016. The LHA level supersedes the former EPA Provisional Health Advisory (PHA) levels of 200 ng/L PFOS and 400 ng/L PFOA. Prior to publication of the LHA, PHA levels were used for this project. There are no applicable federal or state regulatory levels for perfluorononanoic acid (PFNA), perfluorobutane sulfonate (PFBS), or other PFCs sampled.

The ADEC Contaminated Sites Program has published revised soil and groundwater cleanup levels, effective 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
Agency for Toxic Substances and Disease Registry (ATDSR)	Minimal risk levels (MRLs) for consumption*	30 ng per kilogram of body weight per day	20 ng per kilogram of body weight per day

Note: *MRL applies to consumption from 15 to 365 days; there are no chronic or long-term MRLs for PFCs.

1.4 Project Objectives and Scope

At the request of the ADEC, Shannon & Wilson, Inc. identified and sampled private wells in nine geographic search areas near the RFTC to date. 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.

Our primary objective of the services described in this report was to evaluate the potential for human exposure to PFC-containing water in private water-supply wells. This report describes the findings of our private well search and sampling effort in Areas 4 through 8. We sampled a subset of identified private wells in these areas, as described below. The secondary objective of

tasks described herein was to evaluate the potential presence of PFCs in MWs, surface water, outlier wells, and other media, and to collect quarterly samples from a subset of these wells.

Expansion of our well search into each subsequent area was authorized iteratively based on the results of sampling from previous areas. This report summarizes the findings of our June through October well searches and first-time sampling effort, and July, October, and November quarterly sampling effort. Please note that this project is ongoing; additional private well samples may be collected in Areas 4 through 8 at a later date.

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 expanded private well search area includes parcels to the northwest, southwest, and northeast of the RFTC, which are depicted as Areas 4 through 8 in the enclosed Figure 1, Private Well Search and Sample Areas. Our well search now extends to the area bound by Standard Avenue or a one-half-mile radius from the RFTC to the south; the Mitchell Expressway to the west; Eagan Avenue, Airport Way, or the Chena River to the north; and Lathrop Street or Cowles Street to the east. Area 9, centered on Boat Street to the north of Airport Way, was added in November 2016 and is not included in this report (Figure 1).

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. Beginning in June 2016 we submitted these water samples to TestAmerica Laboratories, Inc. (Test America) for quantitation of the six EPA Unregulated Contaminant Monitoring Rule (UCMR) PFCs by Method WS-LC-0025. Prior to this date we submitted water samples for determination of 19 PFCs, to the same laboratory and by the same method.

Area 4, originally known as the southwest quadrant search area, consists of the area bound by the boundary of our initial ½-mile search area to the east, Standard Avenue to the south, Peger Road to the west, and Peger Lake to the north. Area 5 consists of the area bound by the boundary of Areas 2, 3, and 6 to the east, the Mitchell Expressway to the south, Alston Road to the west, and Airport Way to the north. Area 6 consists the area bound by Wilbur Street to the east, the boundaries of Areas 3, 2, and 5 to the south and west, and Airport Way to the north. Area 7

consists of the area bound by Cowles Street to the east, the Mitchell Expressway to the south, Lathrop Street to the west, and 20th Avenue to the north. Area 8 consists of parcels within the triangular area bound by Alston Road to the east, the Mitchell Expressway to the south and west, and Airport Way to the north. 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.

2.0 FIELD ACTIVITIES

This section summarizes field activities performed between June 6 and November 7, 2016, in an effort to identify and sample private water-supply wells, surface water, and MWs in our previously described search areas. We also include field activities relating to other off-site tasks, including collecting water samples from outlier wells, vegetable matter, AFFF used by the Fairbanks Fire Department, and re-sampling the quarterly well monitoring network.

2.1 Well Search and Sample Areas

On June 2, 2016, we began the Area 4 well search by downloading a list of improved and unimproved parcels and the owners of those properties within the search area from the Fairbanks North Star Borough (FNSB) property database. As with previous well searches for this project, we also referenced the Alaska Department of Natural Resources (DNR) Well Log Tracking System (WELTS) and subsurface water rights files listed on the DNR Water Estate Map.

The goal of our Area 4 well search was to contact the owner or occupant of each improved parcel within the search area to identify the presence or absence of a well. We began by revising the well search letter and fact sheet used in the Area 1 through 3 well searches. The letters and fact sheets, included in Appendix A, describe the potential presence of PFCs in groundwater near the RFTC. We prepared mailers 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 4 and prepared maps to cross-reference with property records during the door-to-door well search.

On June 6, 2016, we began contacting most owners and occupants in Area 4. The owner of 2136 Standard Avenue (parcel account number [PAN] 471542) contacted us prior to beginning the Area 4 well search. This well was therefore sampled on May 16 and is discussed as an outlier well in *February to May 2016 Private Well Sampling Summary Report*. Area 4 is mixed residential, commercial, and industrial; 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. For properties contacted via telephone, we did not mail or hand-deliver the revised well-search letter. We completed a *Private Well Inventory Survey Form* for each identified well, copies included in Appendix B. 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.

We identified six parcels with confirmed active wells and one confirmed unused water well within Area 4. Well search results are summarized in Tables 2 and 6, 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 or drilling records, these depths are marked with an asterisk. The results of the well search in Area 4 are depicted in Figure 3, Area 4 Well Search Results.

**TABLE 2
AREA 4 WELL SUMMARY**

Yes – active well	6
Yes – inferred well	0
Yes – unused well	1
Unknown	0
No – inferred	4
No – confirmed	25
Total parcels	36

On July 21, 2016, we expanded the well search and sampling area to include Areas 5, 6, and 7 (Figure 1). Based on conversations with the CoF and ADEC we suspected that the majority of parcels in these areas are served by the municipal water system. The goal of our Areas 5 and 7 well search was therefore to contact the owner or occupant of each parcel that, per Golden Heart Utilities (GHU) records, is not connected to the municipal water system. Previous well searches for this project have sought to contact the owner or occupant of each improved parcel within the search area. On July 25 we contacted GHU to request municipal water connection records for parcels within these three areas. GHU initially declined to provide connection records, citing privacy concerns.

On August 16, Ms. Janice Wieggers of the ADEC Contaminated Sites Program provided an annotated map indicating that the majority of parcels in Area 5 south of 19th Avenue are not connected to the municipal water system. These annotations were based on information on file

with the ADEC Drinking Water Program. We revised the Area 4 well-search letter and fact sheet to reflect project changes; these documents are included in Appendix A. On August 18 we began the door-to-door well search in the southern portion of Area 5. Our well search methodology was the same as for Area 4, with the exception of contacting only properties suspected of being unconnected to the municipal water system.

Fairbanks Sewer and Water (FSW) is the parent company for each of the municipal water companies in the Fairbanks area, GHU, College Utilities Corporation (CUC), and Utility Services of Alaska, Inc. (USA). We remained in contact with FSW representatives in July and August regarding the connection records request. On September 7 we signed a confidentiality agreement with FSW indicating that we will use said connection information “for the purpose of planning and/or implementing a solution to area perfluorinated compounds groundwater contamination” only. The confidentiality agreement was countersigned on September 8; later that day we received the connection records.

On September 9 we completed the door-to-door portion of the Area 5 well search by visiting parcels north of 19th Avenue. The majority of parcels reportedly not connected to the municipal water system in the northern portion of Area 5 were vacant and undeveloped, or holding a structure that was split between two parcels. We 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 advisory letter was mailed to the listed FNSB mailing address for each parcel, excluding duplicates. In nine cases these letters were returned by the U.S. Postal Service as undeliverable with no forwarding address.

We identified 35 parcels with confirmed active wells and eight confirmed unused water well within Area 5. Well search results are summarized in Tables 3 and 7, organized by presence or absence of a well. It is possible that a portion of these properties have unused water supply wells, or have seasonally active wells for outdoor use. The results of the well search in Area 5 are depicted in Figure 4, Area 5 Well Search Results.

TABLE 3
AREA 5 WELL SUMMARY

Yes – active well	35
Yes – inferred well	0
Yes – unused well	8
Unknown	2
No – inferred	157
No – confirmed	55
Total parcels	257

Groundwater monitoring of trichloroethene and benzene plumes originating at the ADOT&PF Peger Road Facility is ongoing by Ahtna Engineering Services, LLC (Ahtna), under the direction of the ADEC. Beginning in April we coordinated with Mr. Andrew Weller of Ahtna and Mr. Jim Fish of ADEC to obtain information relating to private wells and their uses within the ADOT&PF private-well monitoring area. The Ahtna private-well monitoring area includes the entirety of Area 6; we therefore did not conduct a well search in this area. As of the last Ahtna well search in 2013 there were no private wells in Area 6. It is possible but unlikely that new wells have been installed since 2013.

In lieu of including Area 6 in our July and August well search, we prepared and mailed advisory letters describing the project to owners and residents. The advisory letter, included in Appendix A, was mailed to the listed FNSB mailing address for developed properties within the Ahtna private-well monitoring area that we had not already been contacted. Recipients of the August 24 advisory letter included property owners in Area 6, and some property owners in Areas 2 and 3. In eight cases Area 6 advisory letters were returned by the U.S. Postal Service as undeliverable with no forwarding address.

On September 8 we received municipal water connection information for Area 7. On September 9 we conducted the door-to-door well search in Area 7. We identified no parcels with confirmed active or unused water wells within Area 7. In four cases Area 7 advisory letters were returned by the U.S. Postal Service as undeliverable with no forwarding address.

Well search results for Area 7 are summarized in Tables 4 and 8, organized by presence or absence of a well. The results of the well search in Area 7 are depicted in Figure 5, Area 7 Well Search Results. Please note that the northwest corner of Area 7 is part of a larger parcel owned by the Greater Fairbanks Community Hospital Foundation, or Fairbanks Memorial Hospital, and is therefore not included in the well search.

TABLE 4
AREA 7 WELL SUMMARY

Yes – active well	0
Yes – inferred well	0
Yes – unused well	0
Unknown	1
No – inferred	129
No – confirmed	81
Total parcels	211

On October 4, we expanded the search area to include Area 8. Our well search methodology was the same as for neighboring Area 5; we made a reasonable attempt to contact the owner and/or occupant of each property reportedly not connected to the municipal water system. Area 8 is served by a combination of GHU and CUC municipal water systems. We received municipal water connection information for Area 8 on October 5, and revised the well search and advisory letters (Appendix A). We conducted the door-to-door well search on October 11 using the updated well search letter, and mailed the updated advisory letter to Area 8 parcels on October 11 and 12. In three cases Area 8 advisory letters were returned by the U.S. Postal Service as undeliverable with no forwarding address.

We identified 16 parcels with confirmed active wells and five parcels with unused wells within Area 8. We infer that two additional parcels (PANs 168734 and 129291) have wells because they are reported as such in the DNR WELTS or by a knowledgeable neighbor; however, these parcels appeared unoccupied during the door-to-door well search. Well-search results are summarized in Tables 5 and 9. The results of the well search in Area 8 are depicted in Figure 6, Area 8 Well Search Results.

TABLE 5
AREA 8 WELL SUMMARY

Yes – active well	16
Yes – inferred well	2
Yes – unused well	5
Unknown	2
No – inferred	108
No – confirmed	61
Total parcels	194

We were unable to contact all of the owners and occupants in Areas 5, 7, and 8 during our initial well search. These properties are indicated as “yes - inferred well” or “unknown” in Tables 6 through 9. Additionally, in some cases we were unable to schedule sampling appointments for identified wells in October. We will continue to follow up with these properties as part of our ongoing well search and sampling effort, with the following exceptions:

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

2.2 Private and Monitoring Well Sampling

We have conducted nine private well, MW, and surface-water sampling events in June through November 7. Shannon & Wilson personnel Marcy Nadel, Geologist; Tiffany Green, Environmental Scientist; Peter Grey, Geologist; and Sheila Hinckley, Environmental Scientist collected analytical water samples from private wells and MWs in the time period covered in this report. These individuals are State of Alaska Qualified Samplers per 18 AAC 75.333[c] and 18 AAC 78.088[c]. 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. Initially we sampled each category 1 well, where possible, and a representative subset of category 2 and 3 wells. Beginning in July we began to sample remaining category 1, 2, and 3 wells, where possible. The private well, MW, and surface-water sampling events described below therefore include some category 2 and 3 wells in Areas 1 through 3.

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: ± 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. In cases where the sampling location was difficult to access (e.g., close to the floor, in a corner, etc.) we collected the water sample using a disposable plastic cup and immediately transferred its contents to the laboratory-supplied containers.

For groundwater MWs, we collected analytical water samples using a submersible pump and disposable non-Teflon tubing (Appendix D, Project Photographs). To date we have collected two equipment-rinsate samples (*EB-304A* and *EB-507*), in adherence to the prescribed minimum 10-percent frequency for the overall project. We measured the total well depth and depth to water with respect to 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 $^{\circ}\text{C}$ 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.

Samples collected from MWs sampled in June through October were typically named using their original well names. These wells are owned by ADOT&PF (*MW-304A*, *MW-304B*, *MW-507*, *MW-508A*, *MW-705A*, *MW-705B*, and *MW-710*), CMR Properties LLC (*526410-MW-1*), and the Alaska Department of Motor Vehicles (*MW-701*). For MWs and Golden Heart Softball Association (GHSA) irrigation wells, we treated purge water using a granular activated carbon (GAC) filter prior to discharge. We did not treat all purge water from the Fairbanks Youth Soccer Association (FYSA) or Fairbanks Dog Park irrigation wells.

On June 20 and 21, we collected private well samples mainly from Area 4 (laboratory Work Order [WO] 19777). This sampling event consisted of nine private wells located on Standard Avenue and Shell Street in Area 4, and one sample from a private well in Area 1 [REDACTED]. We were unable to collect the sample from [REDACTED] earlier as the owners were out of town. We also collected three surface-water samples from Peger Lake, discussed as follows in Section 2.3.

On July 5 and 6, we collected first-time private well samples from Areas 1 and 3, quarterly monitoring network samples, and ADOT&PF MW samples (WOs 20090 and 20105). This sampling event consisted of six category 2 and 3 private well samples, including two irrigation wells that were not sampled previously; nine quarterly re-samples; and six first-time ADOT&PF MW samples, five in Area 2 and one in Area 6. One of the October quarterly monitoring network samples is an ADOT&PF MW (*MW-507*).

We sampled ADOT&PF MWs as there is limited information available through private well sampling in Area 2 (the E.M. Jones Subdivision) and its vicinity. We obtained permission from Mr. Sam Myers, ADOT&PF Environmental Specialist for the Northern Region Maintenance & Operations, and Mr. Jim Fish, the ADEC Project Manager for the ADOT&PF contaminated site, prior to sampling. These wells are as follows:

- *MW-508A*: across 17th Avenue from 2525 17th Avenue, 48 feet deep
- *MW-710*: north of E.M. Jones Subdivision near intersection of 17th Avenue and Kiana Street (northernmost ADOT&PF monitoring well), 49 feet deep
- *MW-304A*: west side of Peger Road near 2060 Peger Road, 45 feet deep
- *MW-304B*: same location as *MW-304A*, 19 feet deep
- *MW-705A*: near intersection of 20th Avenue with Ada Street, 47 feet deep
- *MW-705B*: same location as *MW-705A*, 16 feet deep

On July 18 and 20, we collected first-time private well samples from Areas 1 and 3, outlier well samples, and a quarterly monitoring network sample (WO 20454). This sampling event consisted of four category 2 and 3 private well samples, two outlier wells north of Airport Way, and the finally quarterly re-sample for the month of July.

On August 29, 30, and 31, we collected mainly first-time private well samples from Area 5 (WO 21466). This sampling event consisted of 17 private wells located on Davis Road, Holden Road, Picket Place, and neighboring streets, and one MW located at 1979 Peger Road in Area 3 (*MW-701*).

On September 19, we collected additional private well samples from Area 5 (WO 21927). This sampling event consisted of five private wells located on Davis, Hill, and Holden Roads. Following the receipt of the first analytical data for Area 5 in late September, we began to collect first-time private well samples from Area 5 and 8 at a higher frequency, conducting up to three sampling events per month.

On October 3 and 4, we collected private well samples from Areas 5 and 8 (WO 22485). This sampling event consisted of six private wells located on Picket Place, Hill Road, and 19th Avenue in Area 5, and one private well located at 3416 Vian Way in Area 8. We were in contact with the owner of 3416 Vian Way prior to beginning the Area 8 well search; therefore, we sampled the category 1 well at this address in early October.

On October 17, 18, and 19, we collected private well samples from Areas 5 and 8, one outlier well sample, and quarterly monitoring network samples (WOs 22921 and 22913). This sampling event consisted of eight private wells located on Vian Way, Alston Road, and neighboring streets; one outlier well near Geist Road and Fairbanks Street; and eight quarterly re-sample wells in Areas 1, 2, and 3. One of the October quarterly monitoring network samples is a ADOT&PF MW (*MW-507*). We also collected two surface-water samples from gravel pit lakes in the Picket Place area, discussed in Section 2.3.

On October 24 and 25, we collected private well samples from Areas 3, 5, and 8, and two quarterly monitoring network samples (WOs 23068, 23098, and 23394). This sampling event consisted of one sample each from private wells located on Picket Place, Davis Road, and 19th Avenue, and a quarterly re-sample. A new well was installed at [REDACTED] (platted address [REDACTED]) and the owner requested that we re-sample their well. The sample from [REDACTED] was therefore submitted for PFOS and PFOA only in WO 23098, although this well is not included in the quarterly monitoring network.

On November 7, we collected a quarterly monitoring network sample (WO 23394) from [REDACTED]. This sampling event consisted of the final quarterly re-sample for the month of October. We were unable to collect the sample from this residence earlier because the owners had been out of town.

2.3 Surface-Water Sampling

On June 20, we collected surface-water samples from three locations near the perimeter of Peger Lake (WO 19777). We collected these samples from private docks behind 2051 30th Avenue (northeast corner of Peger Lake), 2031 Van Horn Court (central-eastern portion), and 2142 Standard Ave (southwest corner). The samples were named based on the PAN numbers of the properties from which they were collected, 522384-SW, 563404-SW, and 471551-SW, respectively.

On October 18, we collected surface-water samples from two gravel pit lakes in the Picket Place area (WO 22921). These samples were collected from the southern shore of the Hite gravel pit, north of [REDACTED] (167649-SW), and northwest corner of the King gravel pit

on the undeveloped parcel platted as [REDACTED] d (515493-SW). The King gravel pit also borders [REDACTED].

Surface-water samples were collected from between four inches and two feet below the lake surface by submerging a clean, non-reusable sample container to the appropriate depth. We obtained permission from the property owners prior to sample collection.

2.4 Outlier Wells

On July 11, 2016, we began to identify downgradient wells to sample that were outside our existing well search areas, termed outlier wells. We proposed to identify and sample three private and groundwater monitoring wells, general locations as follows:

- Airport Way between Kiana Street and University Avenue: 1.5 to 2.1 miles northwest or west-northwest of the RFTC;
- Westgate neighborhood: 1.7 to 2.2 miles northwest; and
- Geist Road between Fairbanks Street and University Avenue and Geist Road: 2.7 to 3.0 miles northwest.

We were unable to identify wells in the Airport Way area between Kiana Street and University Avenue, instead we sampled the three following wells:

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

These sample results are included in Figure 10, Surface-Water, MW, and Outlier Well PFOS and PFOA Results.

2.5 AFFF Sampling

At the request of the Fairbanks Fire Department and CoF, on August 30, 2016, we collected a single sample of AFFF from the original 5-gallon bung-top container (WO 21469). The container of three-percent AFFF was packaged in June of 2003 and labeled Lot Number 4311. The Fire Department requested that we sample this container because it is the oldest AFFF that remained

in use at the time. We collected the AFFF sample using a low-density polyethylene (LDPE) eye dropper onsite at the RFTC.

2.6 Quarterly Well Monitoring Network

At the request of ADEC and the CoF, in July we began to re-sample a subset of mainly private wells near and down-gradient of the RFTC. These wells are scheduled to be sampled quarterly (i.e., every three months), and 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, and 3) that are adjacent to or near wells whose combined concentration exceeds 35 ng/L.

With the exception of one ADOT&PF groundwater MW, included due to its strategic location in an area with few private wells, the quarterly well monitoring network does not include MWs. 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. Robert Burgess, the ADEC project manager for the RFTC, indicated ADEC's concurrence with these criteria by e-mail on July 12, 2016.

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. 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 8.

The first quarterly sampling event occurred in July and included 10 wells. The July quarterly sampling event included the following category 1 and 2 wells whose combined PFOS and PFOA concentration exceeded 50 percent of the LHA level in their first sample, but where connection to municipal water was not planned for 2016. The locations of these wells are as follows:

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

The July quarterly sampling event also included one groundwater monitoring well:

- MW-507: Davis Road between Peger Road and Wilbur Street

The July quarterly sampling event included the following locations of active wells adjacent to or near wells whose concentration exceeds 35 ng/L are as follows:

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

We did not sample the following well that meets the above-listed criteria, because the first sample from these wells was collected in May 2016:

- [REDACTED]

We did not sample the following well that meets the above-listed criteria, because the well was disconnected during a renovation in summer 2016:

- [REDACTED]

We did not sample the following wells that meets the above-listed criteria, because connection to the municipal water line was planned for summer 2016:

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

The second quarterly sampling event occurred in October and November and included 11 wells. Municipal water line connections were constructed in October and November at six of the seven homes where they were offered. Construction for the remaining property is planned for spring 2017. The following well was therefore added to the quarterly well monitoring network:

█ [REDACTED]

We did not sample the following well that meets the above-listed criteria, because the well was winterized in early September 2016:

█ [REDACTED]

Applying above-listed criteria, on October 13 the CoF authorized adding the following category 1 and 2 wells whose combined PFOS and PFOA concentration exceeds 50-percent of the LHA to the quarterly well monitoring network beginning in January:

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

Applying above-listed criteria, we also plan to add the following category 1 and 2 wells whose combined PFOS and PFOA concentration exceeds 50-percent of the LHA to the quarterly well monitoring network in January:

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

█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]

Furthermore, we plan to add the following adjacent and near wells in Areas 5 and 8 to the quarterly well monitoring network:

█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]
█	[REDACTED]

We do not plan to include the following wells in the quarterly well sampling network:

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

- Wells for which analytical data has not yet been received

2.7 Vegetable Matter Sampling

Current guidance from the Alaska Department of Health and Social Services (DHSS) Section of Epidemiology is that the toxicological evidence relating to the consumption of garden vegetables watered with groundwater containing PFCs about the LHA is inconclusive. The owners and residents of 2915 Picket Place have used their well water to grow several hundred pounds of potatoes over the summer, for donation to the Fairbanks Community Food Bank and personal consumption. They expressed interest in submitting their garden vegetables for PFC analysis on September 26, following the receipt of analytical data for their well (sample 167631). They have also grown approximately 100 pounds of carrots and a smaller quantity of cabbage, onions, rutabaga, brussels sprouts, cauliflower, peas, and rhubarb, primarily for personal consumption. The location of the [REDACTED] garden is included in Figure 10, Surface-Water, MW, and Outlier Well PFOS and PFOA Results.

On October 6, 2016, we collected three separate potatoes for analysis and submitted samples of each potato for determination of PFC concentrations in both skin and flesh. We collected vegetable matter samples directly from the ground prior to harvest, from the garden bed southwest of [REDACTED]. This garden bed is shown in Appendix D, Project Photographs. We used the same sample collection and preservation methods used for other vegetable-matter-sampling projects Shannon & Wilson has performed in the Fairbanks area.

We selected the garden bed southwest of [REDACTED] because the owners identified it as having received the most watering. This garden bed is immediately adjacent to the King Gravel pit, located on the undeveloped parcel platted as [REDACTED]. The owners confirmed that water from the lake is not used for gardening (Appendix D). He stated that the garden is watered with a hose and sprinkler system fed from the spigot at the base of the pressure tank in their garage. Sample 167631 was collected from before the water softener in their garage, and should therefore be representative of the water used to irrigate their garden.

2.8 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. The laboratory temperature requirements for vegetable samples are 0 °C and 10 °C. 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 or to Vista Analytical Laboratories (Vista) in El Dorado Hills, 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. We shipped the AFFF sample in a separate cooler from the water samples to avoid cross-contamination. The complete TestAmerica laboratory reports (WOs 19777, 20090, 20105, 20454, 21466, 21469, 21927, 22485, 22913, 22921, 23068, 23098, and 23394) and Vista laboratory report (WO 1601279) are included in Appendix E.

2.9 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, including upgradient wells. 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 PHA levels or LHA level, and those who requested to be notified immediately.

We prepared results letters tailored to each owner or occupant, following the receipt of analytical data. Results letters for Peger Lake were mailed to property owners and occupants whose homes and businesses adjoin Peger Lake. Results letters for the two Picket Place gravel-pit lake samples were mailed to the owner of each lake only. Results letters for [REDACTED] vegetable matter samples were mailed to the owners of the garden.

2.10 Alternative Water Source

In late May 2016, the Fairbanks City Council voted to approve funding to connect six homes on 30th Avenue to municipal water. [REDACTED]
[REDACTED] In July the City Council elected to add an additional home, [REDACTED], to the municipal water connection list. Six of the seven homes were connected to the municipal water line in October and November 2016; the owners of [REDACTED] requested to delay construction until 2017.

The CoF elected to provide 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. The Fairbanks Fire Department coordinated bottled water deliveries beginning in February 2016. The CoF contracted Spring Alaska, a private water-delivery company, to take over bottled water deliveries in October 2016. Deliveries are ongoing, and are being coordinated by Andrew Ackerman of the City of Fairbanks and Jim Mason of Spring Alaska.

As of November 16, 2016, 30 homes and businesses have been offered bottled water deliveries; some have declined. As of December 7, we have not received additional analytical results that would necessitate an update to the water deliveries list sent to the CoF on November 16. Bottled water recipients are listed in Appendix F; this list excludes three category 3 wells whose PFC concentrations exceed the LHA (samples 169099, 536555-2, and 536555-5). Please note that Appendix F includes properties where water deliveries have been discontinued because they were connected to the municipal water system.

Please note that the occupants of [REDACTED] were offered bottled water deliveries in March based on their proximity to water-supply wells with concentrations above the LHA, before their water sample results were available. The occupants of this household declined deliveries, and their water sample concentrations, when received, were below the LHA. PAN

95630 was removed from the water deliveries list on October 14 to avoid confusion with households whose concentrations exceed the LHA (Appendix F).

2.11 Public Information

In consultation with the CoF, the ADEC Contaminated Sites Program has created a webpage summarizing the RFTC project history and goals. The webpage includes a simplified regional results figure depicting private well and MW sample locations above and below the LHA.

On August 11, 2016 the CoF hosted a community meeting at the Noel Wien Public Library at 1215 Cowles Street. At the request of the CoF we prepared and mailed meeting invitations to the owners and/or occupants of properties whose wells we had sampled to date, as well as those whose homes and businesses adjoin Peger Lake. The meeting invitation also included a fact sheet prepared by the Alaska DHSS Section of Epidemiology, dated July 27, summarizing the health effects of exposure to PFOS. The meeting invitation was mailed on July 29, and is included in Appendix A in addition to other communication with owners and occupants. Please note that the DHSS fact sheet refers to PFCs as perfluoroalkyl substances (PFAS); they are considered equivalent.

2.12 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.

- The following samples were collected from after the property's water softener or other in-home treatment system: [REDACTED]
- Our proposal dated June 2, 2016 called for collecting surface-water samples from between one and two feet below the lake surface. Samples from the King and Hite gravel pits were collected from a shallower depth, 4 to 8 inches below the lake surface.
- Our proposal dated July 1, 2016 called for collecting three outlier well samples in July, from between 1.5 and 2.1 miles, 1.7 to 2.2 miles, and 2.7 to 3.0 northwest of the RFTC. We collected two outlier well samples in July and the third in October, from slightly different locations than proposed, due to the actual locations of existing wells of the appropriate depth and delays in obtaining permission to sample.

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 up to 19 PFCs, including PFOS, PFOA, and the four other PFCs listed in the UCMR. We submitted first-time private well and MW samples in June through October for determination of the six UCMR PFCs. TestAmerica typically uses direct aqueous injection (DAI) to analyze for the six UCMR PFCs and solid phase extraction (SPE) to analyze for the longer list of 19. We submitted quarterly well monitoring network samples for PFOS and PFOA only.

We submitted vegetable matter samples to Vista for determination of the six UCMR PFCs using modified EPA Method 537, the laboratory's in-house method for aqueous, solid, and tissue matrices. The laboratory processed the whole potatoes into skin (with incidental flesh) and flesh without skin, and homogenize the samples prior to extraction. The Vista method uses SPE with liquid chromatography/mass spectrometry.

The TestAmerica and Vista laboratory reports and ADEC Laboratory Data Review Checklists for each WO are included in Appendix E, listed in chronological order (WOs 19777, 20090, 20105, 20454, 21466, 21469, 21927, 22485, 22921, 22913, 23068, 23098, 1601279, and 23394).

Analytical results and other relevant information for private wells in Areas 4, 5, and 8 are depicted in Figures 7 through 9, PANs, POFS and PFOA Results, and Well Depths. Please note that one sample included in Figure 7, 471542, was analyzed in May 2016 and is included in a previous report. We did not identify any private wells to sample through our Area 7 well search. Analytical results for ADOT&PF MWs, surface-water samples, and outlier wells are included in Figure 10.

3.1 June Private Well and Surface-Water Samples

Table 10 summarizes the concentrations of PFCs in June private well and surface-water samples (WO 19777). Sample 87249 is a field duplicate of sample 87149. The analytical results for the field-duplicate paid exceed the EPA LHA level for LHA combined concentrations. These result is 76 ng/L for the sum of PFOS and PFOA, for sample 87249 / 87149 collected from the well located at [REDACTED]. The analytical results for the surface-water samples do not exceed the LHA level of ADEC groundwater-cleanup levels for PFOS and PFOA.

3.2 July Private and Monitoring Well Samples

Tables 11, 12, and 13 summarize the concentrations of PFCs in July private well samples (WOs 20454, 20105, and 20090). Table 11, Summary of July 2016 Private and Outlier Well Analytical Results, includes first-time private well and two outlier well samples. Sample 87516 is a field duplicate of sample 87416. The analytical results for two private wells exceed the LHA level. The highest of these results were 770 ng/L PFOS and 11 ng/L PFOA for sample 536555-5, a Fairbanks Youth Soccer Association irrigation well (i.e., category 3).

Table 12, Summary of July 2016 Monitoring Well Analytical Results, includes ADOT&PF MWs located in Areas 2, 3, and 6. Sample MW-607 is a field duplicate sample of MW-507. The analytical results for one private well and one MW exceed the LHA level. The highest of these results 200 ng/L PFOS and 23 ng/L PFOA in sample MW-507 / MW-607, located on the north side of Davis Road between Peger Road and Wilbur Street. These MW analytical results do not exceed the ADEC groundwater-cleanup levels for PFOS and PFOA. Please note that MW-507 is also included in the quarterly well monitoring network.

Table 13, Summary of July 2016 Quarterly Analytical Results, includes wells sampled a second time as part of the quarterly well monitoring network. Sample 669177 is a field duplicate of sample 669077, and sample MW-607 is a field duplicate sample of MW-507. Other than sample MW-507 and its field-duplicate, these results do not exceed the LHA level.

3.3 August Private Well Samples

Table 14 summarizes the concentrations of PFCs in August private well samples (WO 21466). Sample 515607 is a field duplicate of sample 515507, and sample MW-801 is a field duplicate sample of MW-701. The analytical results for 10 private well samples exceed the LHA level. The highest of these results were 310 ng/L PFOS and 38 ng/L PFOA for sample 168271, the well located at [REDACTED] and 300 ng/L PFOS and 42 ng/L PFOA for sample 168483, the well located at [REDACTED]

3.4 AFFF Sample

Table 15 summarizes the concentrations of PFCs in an AFFF product sample collected on August 30, 2016 (WO 21469). There were no field-duplicate samples submitted with this WO. Sample Lot 4311 Ansulite was analyzed for the longer list of 19 PFCs; there are no applicable regulatory levels for this sample. Please note that the results for this sample are reported in mg/L, six orders of magnitude greater than the units reported in other analytical results tables.

3.5 September Private Well Samples

Table 16 summarizes the concentrations of PFCs in September private well samples (WO 21927). There were no field-duplicate samples submitted with this WO. The analytical results for four private well samples exceed the LHA level. The highest results are 260 ng/L PFOS and 28 ng/L PFOA in sample 168467, the well located at [REDACTED]

3.6 October and November Private Well Samples

Tables 17 and 18 summarize the concentrations of PFCs in October private well samples (WOs 22485, 22913, 22921, 23068, and 23098) and one November private well sample (WO 23394). Table 17, Summary of October 2016 Private Well and Surface Water Analytical Results, includes first-time private well samples, two surface-water samples, and one outlier well. Sample 168354 is a field duplicate of sample 168254, sample 168273 is a field duplicate of sample 168173, and sample 168974 is a field duplicate of sample 168874.

The analytical results for 14 first-time private wells and both surface-water samples exceeded the LHA level. The highest private well result is 240 ng/L PFOS and 22 J* ng/L PFOA in sample 147460, the well located at [REDACTED]. The highest surface-water result is 110 ng/L PFOS and 56 ng/L PFOA in sample 515493-SW, collected from the Hite gravel pit north of [REDACTED]. The analytical results for the surface-water samples did not exceed the ADEC groundwater-cleanup levels for PFOS and PFOA.

Table 18, Summary of October and November 2016 Quarterly Analytical Results, includes wells sampled a second or third time as part of the quarterly well monitoring network. Of the 12 wells included in the 'October' quarterly sampling event, one was sampled in November (sample 95630). There were no field-duplicate samples submitted with corresponding WOs 22913, 23098, and 23394. The highest quarterly sample result is 160 ng/L PFOS and 23 ng/L PFOA in sample MW-507, located on the north side of Davis Road between Peger Road and Wilbur Street.

3.7 Vegetable Matter Samples

Table 19 summarizes the concentrations of PFCs in six potato samples collected from the garden at [REDACTED] (WO 1601279), and the sample of well water used to water their garden. There were no field-duplicate samples submitted with this WO. We submitted three samples of potato skin and three samples of potato flesh for analysis; PFCs were not detected in these samples.

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 record and laboratory-receipt form 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. Our QC review encountered the following QA/QC errors that resulted in flags for PFOS or PFOA analytical data:

- The PFOA results for samples *168831*, *168874 / 168974*, *168149*, *168173 / 168273*, and *147460* are also considered estimated and flagged 'J' in the analytical table due to isotope dilution analyte (IDA) recovery failures (WO 22921).

We reviewed analytical sample results (TestAmerica WOs 19777, 20090, 20105, 20454, 21466, 21469, 21927, 22485, 22913, 22921, 23068, 23098, and 23394; Vista WO 1601279) 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 14 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 AND RECOMMENDATIONS

We present here our discussion and recommendations relevant to the RFTC site, down-gradient well search areas, and vicinity. Our recommendations are based on:

- Offsite groundwater conditions inferred through private well and MW analytical water samples collected from June 20 and November 7, 2016.
- The results of testing performed on water, vegetable matter, and AFFF samples we collected from the private wells, MWs, gravel pit lakes, and other locations near and downgradient from the CoF's RFTC property.
- Our previous experience in offsite well search Areas 1 through 3 downgradient from the RFTC, and site and subsurface conditions we observed during our onsite RFTC investigations, as they existed during September 2014 and July 2015.
- Our understanding of the project and information provided by the CoF and Fairbanks Fire Department.
- The limitations of our approved scope, schedule, and budget described in our proposals 31-2-16864-007 through -014, dated June 2 through November 8, 2016.

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.

Of the water sample discussed in this report, there are 33 private well, two MW, and two surface-water sample LHA combined concentrations exceeding the effective LHA level of 65 ng/L. Of the 33 private well exceedances, 26 are category 1 wells, four are category 2 wells, and three are category 3 wells. Six of these private wells are located on 30th Avenue to the west of the intersection with North Van Horn Court. Three of these private wells and both MWs are located directly northwest of the RFTC in Areas 2 and 3. Four of private wells and both surface-water samples are located along Picket Place, northwest of the RFTC. The remaining 20 private wells are located along and off of Davis Road in Areas 5 and 8, stretching as far south as Vian Way and as far north as 19th Avenue. These analytical results are summarized in Figures 7 through 10.

5.1 Quarterly Sampling

To date we have sampled select wells up to three times are part of our quarterly well sampling network. The date of first sample collection ranged from November 2015 to May 2016. The second sample was generally collected in July and the third in October. Table 20, Comparison of Quarterly Analytical Results includes the PFOS, PFOA, and LHA combined results for each quarterly well monitoring network sample. Figure 11, Quarterly Sampling Network Results, compares the LHA combined results for these wells. Please note that bar graphs are scaled for comparison of results within each sample location, and that sample 526576 was not sampled in July.

In most cases the LHA combined concentration in the last sample collected was lower than or remained approximately the same (i.e., change less than or equal to 10 percent) as the first sample collected from a given location. PFOS concentrations in these wells were higher than PFOA concentrations, and variations in LHA combined concentration with time were generally controlled by changes in PFOS. The LHA combined concentration in samples *MW-507* and *87335* increased between the first and last sampling events, *MW-507* by nearly 100 ng/L. However, the first *MW-507* sample was collected earlier than the other first-time samples, in November 2015.

5.2 PFCs Ratios

With the exception of sample *650271*, other PFCs were detected in addition PFOS and PFOA in private wells and MWs sampled for this project. Sample *650271* was collected from the well at [REDACTED] in Area 4, southwest of the RFTC. We observe that the proportions of different PFCs vary between well sample locations within our testing area.

Figure 12, PFC Ratios Downgradient of RFTC, shows the percentage of total PFCs that come from PFOS and PFOA onsite and downgradient of the RFTC. We sum the concentrations of the six UCMR PFCs to calculate total PFC concentration, as some of these wells were tested for more than six compounds. For example, we calculate that an average of 89 percent of the PFCs present in source area samples are PFOS and PFOA. We consider source area samples to be Well Points A, B, C, and D, or those installed immediately adjacent to the RFTC burn pit in 2015.

In contrast, at some offsite wells less than 25 percent of the PFCs present are PFOS and PFOA (Figure 12). In sample *167584*, collected from the Chena Wayside irrigation well, perfluorohexane sulfonate (PFHxS) was encountered at 35 ng/L, PFOS at 6.6 ng/L, and PFOA at 8.4 ng/L. In sample *515493-1*, collected from the well at [REDACTED] PFNA was detected at 1,300 ng/L, PFOS at 78 ng/L, and PFOA at 290 ng/L. The ratios of individual PFC

concentration magnitudes in the offsite groundwater samples are similar to groundwater at the source area for most but not all wells tested.

We note that while PFCs are considered the active ingredient in modern AFFF, the relative concentrations of different PFC analytes within AFFF are unknown. An Oregon State University study analyzed six AFFF formulations manufactured by 3M between 1989 and 2001, and encountered milligram per kilogram (mg/kg) differences in the concentrations of different PFCs. The percent difference in PFOS variation was the lowest at over 50 percent; the highest percent difference was in perfluoro-1-heptanesulfonate (PFHpS) at 105 percent (Backe, 2012). It is also likely that AFFF from different manufacturers would have different proportions of PFCs. Therefore, we would not necessarily expect the proportions of different PFCs in groundwater migrating off the RFTC property to remain the same from 1984 to 2004, the years the burn pit was in use, or to match source area groundwater samples collected in July 2015.

5.3 Concentrations with Depth

We collected data on well depth and the presence or absence of permafrost, where known, as part of our private well search. Well depth is considered known for approximately 60 percent and estimated for approximately 25 percent of the private wells and MWs tested. Please note that in most cases well depths are reported by owners, occupants, or developers. We plotted both known and estimated well depths on two northwest-southeast trending sections in order to evaluate variations in LHA combined concentrations with depth.

The locations of these cross-sections were selected to run parallel with the regional groundwater flow direction (Figure 13, Profile Locations and Groundwater Contours). Section A-A' extends from 0.7 mile southeast of the RFTC to three miles northwest (Figure 14). Section B-B' extends from the intersection of Peger Road and the Mitchell Expressway to approximately 1.5 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, and Hill Road.

We observe that for 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. We do not observe clear trends with depth for locations displayed in Section A-A'.

5.4 Vegetable Matter Results

The Alaska DHSS compared the laboratory detection limits for each potato sample, both skin and flesh, to the applicable MRLs for human consumption established by the ATDSR. The MRLs are 30 nanograms (ng) PFOS per kilogram of body weight per day and 20 ng PFOA per kilogram of body weight per day, for consumption from 15 to 365 days. These potato samples were submitted for the six UCMR PFCs, no PFCs were detected.

The DHSS concluded that it is safe to eat one pound of whole potato per day, or 1.25 pounds of peeled potato per day, each day for a full year. These calculations were based on an average-sized adult (80 kilograms or 176 pounds) and using the highest detection limit of the laboratory instruments as the concentration of PFOS and PFOA in the potatoes. Since the analytical results indicate that concentrations of PFOS and PFOA were less than the detection limits of the instruments, the chemical concentrations in the potatoes are presumably lower than the levels used for these calculations, making these calculations conservative.

5.5 Recommendations

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

- continue to expand the private well search area in response to PFC concentrations as necessary to assess human exposure risk to PFOS- and PFOA-containing water;
- expand the quarterly well sampling network in accordance with established criteria, as discussed in Section 2.6, Quarterly Well Monitoring Network;
- continue to provide an interim alternate water source to the occupants of homes or businesses with category 1 or 2 wells whose well water exceeds the LHA level;
- continue to implement the current plan of providing a permanent alternate water source to these occupants;
- continue to work with the ADEC and DHSS to educate the public regarding the potential health effects of exposure to PFC-containing water;
- decommission the RFTC burn pit; and
- install offsite groundwater MWs to study groundwater flow directions and the presence of permafrost.

Future private well search and sample results, including results for first-time private well samples collected in November, will be included under separate cover. We anticipate a third

offsite summary report will be published in spring 2017 describing offsite tasks and analytical results to date.

6.0 REFERENCES

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TABLE 6
AREA 4 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 residents in the search area. Content has been removed for confidentiality.

TABLE 7
AREA 5 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 residents in the search area. Content has been removed for confidentiality.

TABLE 8
AREA 7 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 residents in the search area. Content has been removed for confidentiality.

TABLE 9
AREA 8 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 residents in the search area. Content has been removed for confidentiality.

TABLE 10
SUMMARY OF JUNE 2016 PRIVATE WELL AND SURFACE-WATER SAMPLE ANALYTICAL RESULTS

Analyte	EPA LHA Level	ADEC Groundwater Cleanup Level	Units	Sample Name and Address or Location										
				87149	87249	105961	471551	577669	650271	106003	471615	522384-SW	563404-SW	471551-SW
Perfluoroheptanoic Acid (PFHpA)	—	—	ng/L	2.8	2.6	<2.0	<2.0	<2.0	<2.0	1.0 J	<2.0	2.0	2.0	2.1
Perfluorooctanoic Acid (PFOA)	70†	400	ng/L	5.0	4.5	1.2 J	1.1 J	0.96 J	<2.0	2.1	0.96 J	3.1	3.0	3.2
Perfluorononanoic Acid (PFNA)	—	—	ng/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.74 J	<2.0	<2.0
Perfluorobutane Sulfonate (PFBS)	—	—	ng/L	3.7	2.8	0.98 J	<2.0	<2.0	<2.0	<2.0	0.99 J	1.6 J	1.7 J	1.7 J
Perfluorohexane Sulfonate (PFHxS)	—	—	ng/L	17	17	2.2	1.6 J	1.0 J	<2.0	2.2	1.9 J	7.0	6.8	6.7
Perfluorooctane Sulfonate (PFOS)	70†	400	ng/L	62	71	1.6 J	<2.0	<2.0	<2.0	3.3	<2.0	19	7.6	6.9
LHA Combined (PFOS + PFOA)	70†	—	ng/L	67	76	2.8	1.1	0.96	N/A	5.4	0.96	22.1	10.6	10.1

Notes: Sample 87249 is a field duplicate of sample 87149.
 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 we compare combined concentrations to 65 ng/L.
 ADEC Alaska Department of Environmental Conservation
 — EPA LHA or ADEC groundwater cleanup level not established
bold Result 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, result is between method detection limit and RL; flag applied by laboratory.
 N/A Not applicable

TABLE 11
SUMMARY OF JULY 2016 PRIVATE AND OUTLIER WELL ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	Sample Name and Address or Location													
			671281	87416	87516	92711	92959	536555-3	593460-3	471372	536555-4	536555-5	593460-4	95630	167584	526410-MW-
Perfluoroheptanoic Acid (PFHpA)	—	ng/L	3.2	3.2	3.2	1.1 J	2.6	1.2 J	1.4 J	1.6 J	6.5	5.6	3.2	—	2.6	5.6
Perfluorooctanoic Acid (PFOA)	70†	ng/L	5.3	4.0	4.3	1.4 J	3.9	2.6	2.9	2.3	12	11	5.8	3.4	3.8	8.4
Perfluorononanoic Acid (PFNA)	—	ng/L	1.2 J	<2.0	<2.0	<2.0	<2.0	<2.0	1.8 J	<2.0	2.5	2.6	0.92 J	—	12	0.76 J
Perfluorobutane Sulfonate (PFBS)	—	ng/L	1.2 J	3.4	3.4	<2.0	3.8	1.2 J	2.4	<2.0	11	8.5	6.3	—	<2.0	11
Perfluorohexane Sulfonate (PFHxS)	—	ng/L	9.3	26	26	1.7 J	22	6.9	8.5	3.0	99	78	41	—	2.0	35
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	17	20	21	1.4 J	28	22	9.9	3.3	740	770	54	19	1.5 J	6.6
LHA Combined (PFOS + PFOA)	70†	ng/L	22	24	25	3	32	25	13	6	752	781	60	22	5	15

Notes: Sample 87516 is a field duplicate of sample 87416.

ng/L nanograms per liter

EPA Environmental Protection Agency

LHA Lifetime Health Advisory

GHSA Golden Heart Softball Association

FYSA Fairbanks Youth Soccer Association

† EPA LHA Level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance we compare combined concentrations to 65 ng/L.

— EPA LHA level not established or analysis not requested

bold Result 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, result is between method detection limit and RL; flag applied by laboratory.

TABLE 12
SUMMARY OF JULY 2016 MONITORING WELL ANALYTICAL RESULTS

Analyte	EPA LHA Level	ADEC Groundwater Cleanup Level	Units	Sample Name and Address or Location								
				MW-304A	MW-304B	MW-507	MW-607	MW-508A	MW-705A	MW-705B	MW-710	EB-304A
Perfluoroheptanoic Acid (PFHpA)	—	—	ng/L	15	9.3	14	15	5.1	5.5	4.1	4.8	<2.0
Perfluorooctanoic Acid (PFOA)	70†	400	ng/L	14	10	22	23	4.7	7.3	6.4	5.2	<2.0
Perfluorononanoic Acid (PFNA)	—	—	ng/L	8.7	2.6	44	44	1.5 J	<2.0	<2.0	1.9 J	<2.0
Perfluorobutane Sulfonate (PFBS)	—	—	ng/L	10	5.3	1.8 J	1.7 J	2.5	6.3	7.2	2.5	<2.0
Perfluorohexane Sulfonate (PFHxS)	—	—	ng/L	85	52	58	58	23	39	30	24	<2.0
Perfluorooctane Sulfonate (PFOS)	70†	400	ng/L	58	9.2	200	200	28	32	22	24	<2.0
LHA Combined (PFOS + PFOA)	70†	—	ng/L	72	19	222	223	33	39	28	29	N/A

Notes: Sample MW-607 is a field duplicate of sample MW-507. Sample EB-304A is an equipment blank taken at MW-304A.
 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 we compare combined concentrations to 65 ng/L.
 ADEC Alaska Department of Environmental Conservation
 DOT&PF Department of Transportation & Public Facilities
 — EPA LHA or ADEC groundwater cleanup level not established
bold Result exceeds EPA LHA level
 < Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
 N/A Not applicable
 J Estimated concentration, result is between method detection limit and reporting limit; flag applied by laboratory.

TABLE 13
SUMMARY OF JULY 2016 QUARTERLY ANALYTICAL RESULTS

Analyte	EPA LHA Level	ADEC Groundwater Cleanup Level	Units	Sample Name and Address or Location										
				127124	167754	669077	669177	87301	87319	87335	87408	92924	MW-507	MW-607
Perfluorooctanoic Acid (PFOA)	70†	400	ng/L	14	8.2	3.5	3.4	3.5	3.8	3.0	5.3	5.3	22	23
Perfluorooctane Sulfonate (PFOS)	70†	400	ng/L	33	45	32	29	24	22	9.2	31	34	200	200
LHA Combined (PFOS + PFOA)	70†	—	ng/L	47	53	36	32	28	26	12	36	39	222	223

Notes: Sample 669177 is a field duplicate of sample 669077, and sample MW-607 is a field duplicate sample of MW-507.

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 we compare combined concentrations to 65 ng/L.

ADEC Alaska Department of Environmental Conservation

DOT&PF Department of Transportation & Public Facilities

— ADEC groundwater cleanup level not established

bold Result exceeds EPA LHA level

TABLE 14
SUMMARY OF AUGUST 2016 PRIVATE AND MONITORING WELL ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	Sample Name and Address or Location																			
			147486	167631	167801	167967	167983	168211	168271	168483	168513	168564	168980	169048	407411	515493-1	515507	515607	515515	537268	MW-701	MW-801
Perfluorooctanoic Acid (PFHpA)	—	ng/L	13	5.5	2.4	19	6.3	17	12	13	10	26	1.8 J	1.3 J	1.5 J	150	1.7 J	1.4 J	1.9 J	7.2	<2.0 J*	3.5 J*
Perfluorooctanoic Acid (PFOA)	70†	ng/L	26	27	3.7	42	20	38	38	42	34	29	2.1	3.0	5.6	290	3.1	3.0	3.5	39	5.1	5.2
Perfluorononanoic Acid (PFNA)	—	ng/L	56	250	0.84 J	300	71	210	140	120	160	5.2	<2.0	0.82 J	12	1300	<2.0	0.69 J	0.74 J	200	<2.0	1.7 J
Perfluorobutane Sulfonate (PFBS)	—	ng/L	35	2.6	<2.0	3.4	2.0	19	26	28	16	28	<2.0	<2.0	<2.0	8.6	<2.0	<2.0	<2.0	8.6	<2.0 J*	7.0 J*
Perfluorohexane Sulfonate (PFHxS)	—	ng/L	180	41	9.2	50	18	83	150	140	100	110	8.5	11	12	68	8.6	8.5	10	68	30	30
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	290	62	19	82	41	190	310	300	230	160	19	35	22	78	22	21	25	170	21	21
LHA Combined (PFOS + PFOA)	70†	ng/L	316	89	23	124	61	228	348	342	264	189	21	38	28	368	25	24	29	208	26	26

Notes: Sample 515607 is a field duplicate of sample 515507, and sample MW-801 is a field duplicate sample of MW-701.
 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 we compare combined concentrations to 65 ng/L.
 — EPA LHA level not established
 DOT&PF Department of Transportation & Public Facilities
bold Result 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, result is between method detection limit and reporting limit; flag applied by laboratory.
 J* Estimated concentration, result is flagged due to field-duplicate relative percent difference (RPD) failure; flag applied by Shannon & Wilson.

TABLE 15
SUMMARY OF AFFF SAMPLE ANALYTICAL RESULTS

Analyte	Units	Sample Name
		<i>Lot 4311 Ansulite</i>
		AFFF product, manufacture date 6/2003
Perfluorobutanoic acid (PFBA)	mg/L	30 JB
Perfluoropentanoic acid (PFPeA)	mg/L	<130
Perfluorohexanoic acid (PFHxA)	mg/L	340
Perfluoroheptanoic acid (PFHpA)	mg/L	<130
Perfluorooctanoic acid (PFOA)	mg/L	47 JB
Perfluorononanoic acid (PFNA)	mg/L	<130
Perfluorodecanoic acid (PFDA)	mg/L	<130
Perfluoroundecanoic acid (PFUnA)	mg/L	<130
Perfluorododecanoic acid (PFDoA)	mg/L	<130
Perfluorotridecanoic Acid (PFTriA)	mg/L	<130
Perfluorotetradecanoic acid (PFTeA)	mg/L	56 JB
Perfluoro-n-hexadecanoic acid (PFHxDA)	mg/L	47 JB
Perfluoro-n-octadecanoic acid (PFODA)	mg/L	<130
Perfluorobutane Sulfonate (PFBS)	mg/L	<130
Perfluorohexane Sulfonate (PFHxS)	mg/L	<130
Perfluoro-1-heptanesulfonate (PFHpS)	mg/L	<130
Perfluorodecane sulfonate (PFDS)	mg/L	<130
Perfluorooctane Sulfonate (PFOS)	mg/L	<130
Perfluorooctane Sulfonamide (FOSA)	mg/L	<130

Notes:

AFFF Aqueous film-forming foam

mg/L milligrams per liter

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

JB Analyte considered not detected at RL or concentration originally reported in the sample (higher of the two values) due to method-blank detection; flag applied by laboratory.

TABLE 16
SUMMARY OF SEPTEMBER 2016 PRIVATE WELL ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	Sample Name and Address or Location				
			167886	168424	168467	407429	515469
Perfluoroheptanoic Acid (PFHpA)	—	ng/L	6.9	15	9.6	6.6	1.1 J
Perfluorooctanoic Acid (PFOA)	70†	ng/L	19	25	28	31	2.7
Perfluorononanoic Acid (PFNA)	—	ng/L	83	20	96	150	<2.0
Perfluorobutane Sulfonate (PFBS)	—	ng/L	6.2	14	19	9.6	<2.0
Perfluorohexane Sulfonate (PFHxS)	—	ng/L	39	110	120	67	7.6
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	170	140	260	96	18
LHA Combined (PFOS + PFOA)	70†	ng/L	189	165	288	127	21

Notes:

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 we compare combined concentrations to 65 ng/L.

— EPA LHA level not established

bold Result 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, result is between method detection limit and reporting limit; flag applied by laboratory.

TABLE 17
SUMMARY OF OCTOBER 2016 PRIVATE WELL AND SURFACE WATER ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	Sample Name and Address or Location												
			168017	168025	168033	168254	168354	168726	169099	515493-2	129089	147460	168149	168173	168273
			T	T	T	T	T	T	T	T	T	T	T	T	T
Perfluoroheptanoic Acid (PFHpA)	—	ng/L	22	19	20	17	17	2.4	32	8.7	10	7.4	1.1 J*	<2.0 J*	<2.0
Perfluorooctanoic Acid (PFOA)	70†	ng/L	36	36	39	32	34	6.5	80	12	19	22 J*	4.0 J*	2.4 J*	2.3 J*
Perfluorononanoic Acid (PFNA)	—	ng/L	130	200	220	200	210	7.0	510	21	<2.0	<2.0 J*	<2.0 J*	<2.0 J*	<2.0 J*
Perfluorobutane Sulfonate (PFBS)	—	ng/L	6.8	3.9	5.2	3.7	4.0	4.7	3.7	1.7 J	7.5	28	2.3	1.6 J	1.6 J
Perfluorohexane Sulfonate (PFHxS)	—	ng/L	34	26	29	25	27	23	120	11	39	140	15	9.1	8.7
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	90	43	38	50	54	54	94	22	18	240	7.4	16	17
LHA Combined (PFOS + PFOA)	70†	ng/L	126	79	77	82	88	61	174	34	37	262	11	18	19

Notes: Sample 168354 is a field duplicate of sample 168254; and sample 168273 is a field duplicate of sample 168173.

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 Result 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, result is between method detection limit and reporting limit; flag applied by laboratory.

J* Estimated concentration, no direction of bias, result is flagged due to isotope dilution analyte (IDA) recovery failure; flag applied by Shannon & Wilson.

TABLE 17 CONTINUED
SUMMARY OF OCTOBER 2016 PRIVATE WELL AND SURFACE WATER ANALYTICAL RESULTS

Analyte	EPA LHA Level	ADEC Groundwater Cleanup Level	Units	Sample Name and Address or Location										
				168823	168831	168874	168974	64751	167649-SW	515493-SW	MW-301D	168076	168176	168432
				—	—	—	—	+	—	—	—	—	—	—
Perfluoroheptanoic Acid (PFHpA)	—	—	ng/L	4.4	1.7 J	1.3 J*	1.3 J*	14	4.4	13	5.1	1.3 J	1.6 J*	7.6
Perfluorooctanoic Acid (PFOA)	70†	400	ng/L	10	5.8 J*	5.2 J*	5.5 J*	26	11	56	11	7.2 J*	7.6 J*	20 J*
Perfluorononanoic Acid (PFNA)	—	—	ng/L	0.98 J*	0.67 J*	<2.0 J*	<2.0 J*	2.7	2.4	6.7	<2.0	<2.0 J*	<2.0 J*	1.2 J*
Perfluorobutane Sulfonate (PFBS)	—	—	ng/L	7.8	4.4	3.7	3.7	15	6.1	7.8	7.1	5.1	5.2	15
Perfluorohexane Sulfonate (PFHxS)	—	—	ng/L	36	23	19	20	35	31	55	51	34	37	100
Perfluorooctane Sulfonate (PFOS)	70†	400	ng/L	110	87	61	63	19	95	110	40	22	23	150
LHA Combined (PFOS + PFOA)	70†	—	ng/L	120	93	66	69	45	106	166	51	29	31	170

Notes: Sample 168974 is a field duplicate of sample 168874; and sample 168176 is a field duplicate of sample 168076.

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.

ADEC Alaska Department of Environmental Conservation

— EPA LHA level not established

bold Result 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, result is between method detection limit and reporting limit; flag applied by laboratory.

J* Estimated concentration, no direction of bias, result is flagged due to isotope dilution analyte (IDA) recovery failure; flag applied by Shannon & Wilson.

TABLE 18
SUMMARY OF OCTOBER AND NOVEMBER 2016 QUARTERLY ANALYTICAL RESULTS

Analyte	EPA LHA Level	Units	Sample Name and Address or Location												Equipment Blank
			127124	167754	669077	87301	87319	87408	92924	MW-507	515485	87335	526576	95630	EB-507
Perfluorooctanoic Acid (PFOA)	70†	ng/L	12	8.6	2.8 J*	3.1	3.9	5.2	5.1	23	8.0	3.7	3.4	3.6	<2.0
Perfluorooctane Sulfonate (PFOS)	70†	ng/L	27	40	20	20	19	30	26	160	25	11	33	18	<2.0
LHA Combined (PFOS + PFOA)	70†	ng/L	39	49	23	23	23	35	31	183	33	15	36	22	N/A

Notes:
 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 we compare combined concentrations to 65 ng/L.
 DOT&PF Department of Transportation & Public Facilities
bold Result exceeds EPA LHA level
 < Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
 N/A Not applicable
 J* Result is considered estimated (no direction of bias), due to a QC failure. Flag was applied by Shannon & Wilson, Inc.

TABLE 19
SUMMARY OF VEGETABLE MATTER ANALYTICAL RESULTS

Analyte	Sample Name and Description						
	167631	167631-V1L1	167631-V1L2	167631-V2L1	167631-V2L2	167631-V3L1	167631-V3L2
	Water-supply well at 2915 Picket Place	Potato 1, outer layer (skin)	Potato 1, inner layer (flesh)	Potato 2, outer layer (skin)	Potato 2, inner layer (flesh)	Potato 3, outer layer (skin)	Potato 3, inner layer (flesh)
	ng/L	ng/g	ng/g	ng/g	ng/g	ng/g	ng/g
Perfluorobutane Sulfonate (PFBS)	2.6	<4.69	<1.86	<5.03	<1.87	<3.91	<2.23
Perfluoroheptanoic Acid (PFHpA)	5.5	<2.34	<0.931	<2.52	<0.933	<1.96	<1.12
Perfluorohexane Sulfonate (PFHxS)	41	<4.69	<1.86	<5.03	<1.87	<3.91	<2.23 J*
Perfluorooctanoic Acid (PFOA)	27	<1.17	<0.466	<1.26	<0.466	<0.978	<0.558 J*
Perfluorooctane Sulfonate (PFOS)	62	<4.69	<1.86 J*	<5.03	<1.87 J*	<3.91	<2.23 J*
Perfluorononanoic Acid (PFNA)	250	<2.34	<0.931 J*	<2.52	<0.933 J*	<1.96	<1.12 J*
PFOS + PFOA Combined	89	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

ng/L nanograms per liter

ng/g nanograms per gram (dry weight)

< Analyte not detected; limit of detection (LOD) listed, unless otherwise flagged due to quality control (QC) failures.

N/A Not applicable

J* Estimated concentration; flag applied by Shannon & Wilson due to low surrogate recovery (i.e., QC failures).

TABLE 20
COMPARISON OF QUARTERLY ANALYTICAL RESULTS

Sample Name	Sample Date	Sample Location	PFOA (ng/L)	PFOS (ng/L)	LHA Combined (PFOS+ PFOA)	Exceed LHA Level?†
92924	October-16	[REDACTED]	5.1	26	31	NO
	July-16		5.3	34	39	NO
	March-16		4.6	42	47	NO
669077	October-16	[REDACTED]	2.8 J*	20	23	NO
	July-16		3.5	32	36	NO
	March-16		3.9	35	39	NO
87408	October-16	[REDACTED]	5.2	30	35	NO
	July-16		5.3	31	36	NO
	February-16		5.0	43	48	NO
87301	October-16	[REDACTED]	3.1	20	23	NO
	July-16		3.5	24	28	NO
	February-16		2.3	30	32	NO
87319	October-16	[REDACTED]	3.9	19	23	NO
	July-16		3.8	22	26	NO
	February-16		3.3	32	35	NO
MW-507	October-16	DOT&PF MW (39 ft)	23	160	183	YES
	July-16		23	200	223	YES
	November-15		21	63	84	NO
167754	October-16	[REDACTED]	8.6	40	49	NO
	July-16		8.2	45	53	NO
	April-16		8.9	51	60	NO
127124	October-16	[REDACTED]	12	27	39	NO
	July-16		14	33	47	NO
	April-16		14	68	82	YES
526576	October-16	[REDACTED]	3.4	33	36	NO
	April-16		3.4	65	68	YES
	October-16		3.7	11	15	NO
87335	July-16	[REDACTED]	3.0	9.2	12	NO
	February-16		2.8	10	13	NO
	November-16		3.6	18	22	NO
95630	July-16	[REDACTED]	3.4	19	22	NO
	May-16		4.2	17	21	NO

Notes: For field-duplicate samples the higher of the two results is reported

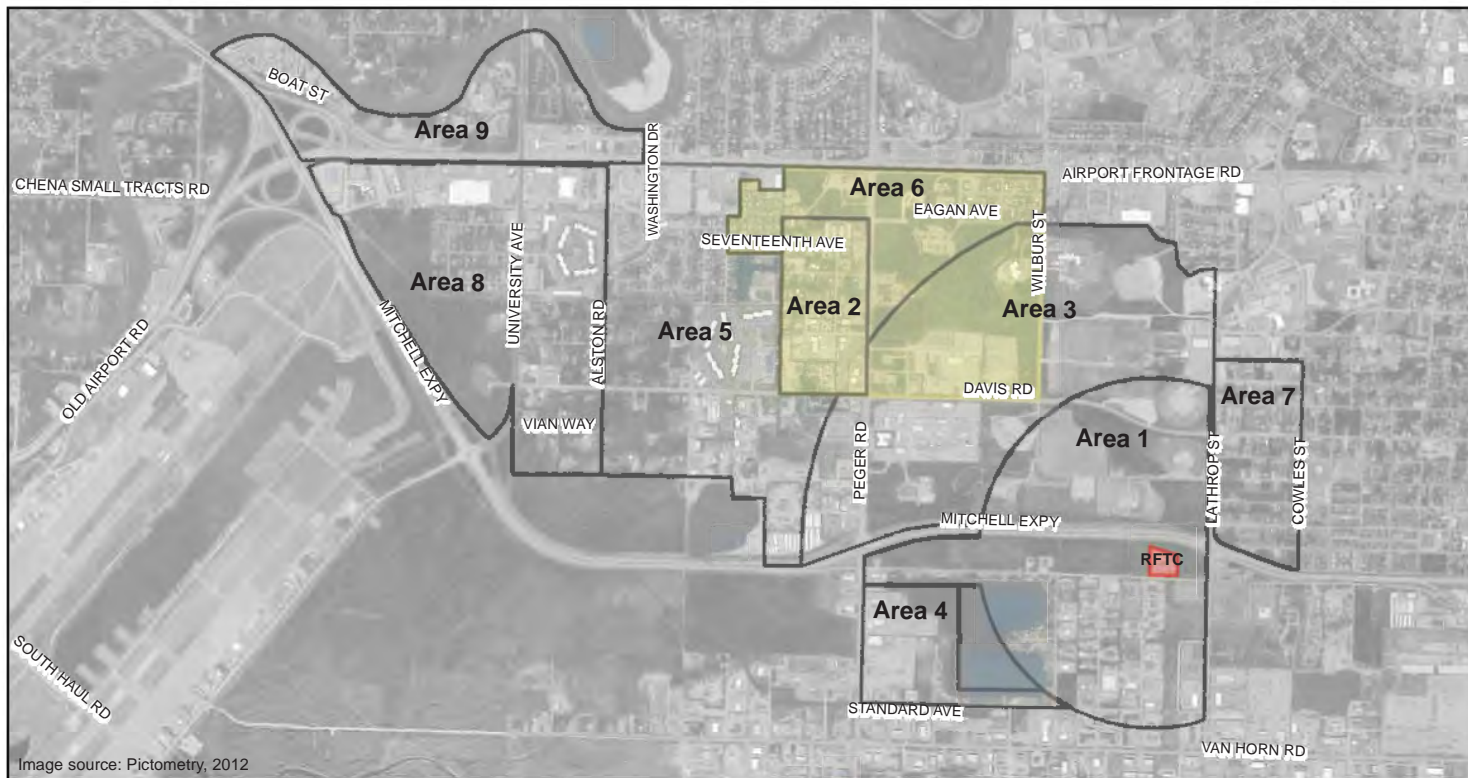
ng/L nanograms per liter

LHA Lifetime Health Advisory

† EPA LHA Level is 70 ng/L for PFOS and PFOA combined; following ADEC guidance we compare combined concentrations to 65 ng/L.

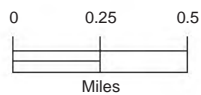
bold Result exceeds EPA LHA level

J* Estimated concentration, no direction of bias, flag applied by Shannon & Wilson.



LEGEND

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



Regional Fire Training Center
Fairbanks, Alaska

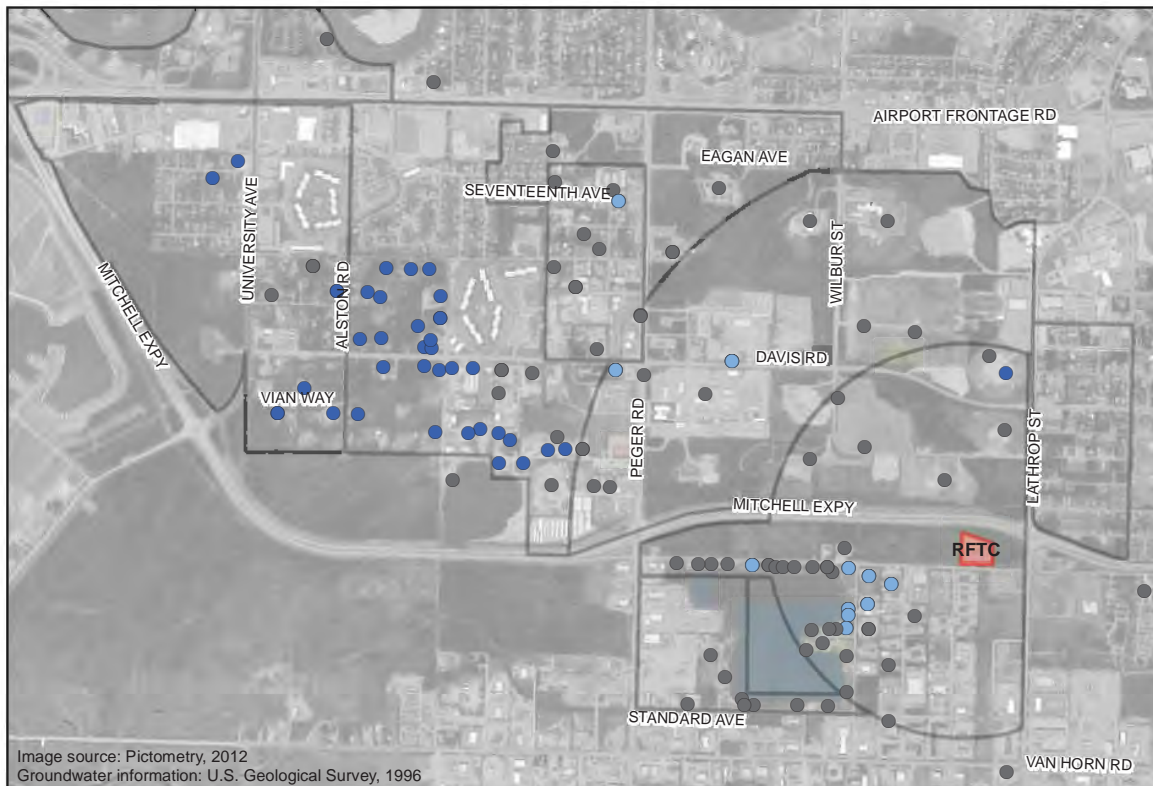
PRIVATE WELL SEARCH AND SAMPLE AREAS

December 2016

31-1-11735-008

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1



LEGEND

Quarterly well monitoring network:

- Included (October)
- Included (January/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

December 2016

31-1-11735-008







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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

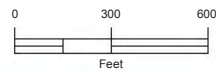
FIG. 2

Pathname: \\Shannon\GIS\11735-008\Area 4 Well Search.mxd Date: 12/27/2016 4:05pm



LEGEND

- | | | |
|---|---|---|
|  Area 4 Boundary |  Yes - active well |  No - inferred |
|  Yes - inferred well |  No - confirmed | |
|  Yes - unused well | | |



Regional Fire Training Center
Fairbanks, Alaska

**AREA 4
WELL SEARCH RESULTS**

December 2016 31-1-11735-008

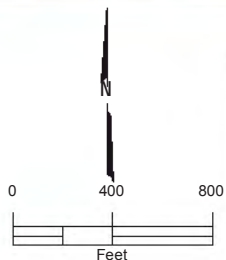
SHANNON & WILSON, INC.
CONSULTING AND ENVIRONMENTAL TECHNOLOGISTS

FIG. 3



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

LEGEND



Regional Fire Training Center
Fairbanks, Alaska

AREA 5 WELL SEARCH RESULTS

December 2016

31-1-11735-008

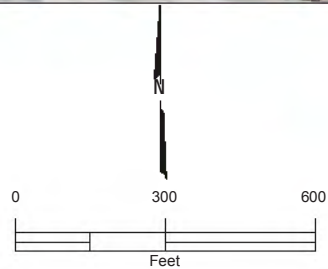
SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 4



LEGEND

-  Area 7 Boundary
-  Unknown
-  No - inferred
-  No - confirmed



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Fairbanks, Alaska

AREA 7 WELL SEARCH RESULTS

December 2016

31-1-11735-008

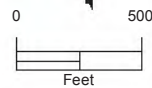
SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 5



LEGEND

	Area 8 Boundary		Yes - active well		Unknown
	Yes - inferred		No - inferred		
	Yes - unused		No - confirmed		



Regional Fire Training Center
Fairbanks, Alaska

AREA 8 WELL SEARCH RESULTS

December 2016

31-1-11735-008

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 6



LEGEND

- Area 4 Boundary
- Parcel Sampled
- Parcel Not Sampled

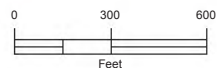
PAN
PFOA result
PFOS result
Well Depth

Combined (PFOS+PFOA) result

- <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

* = Depth obtained from well log



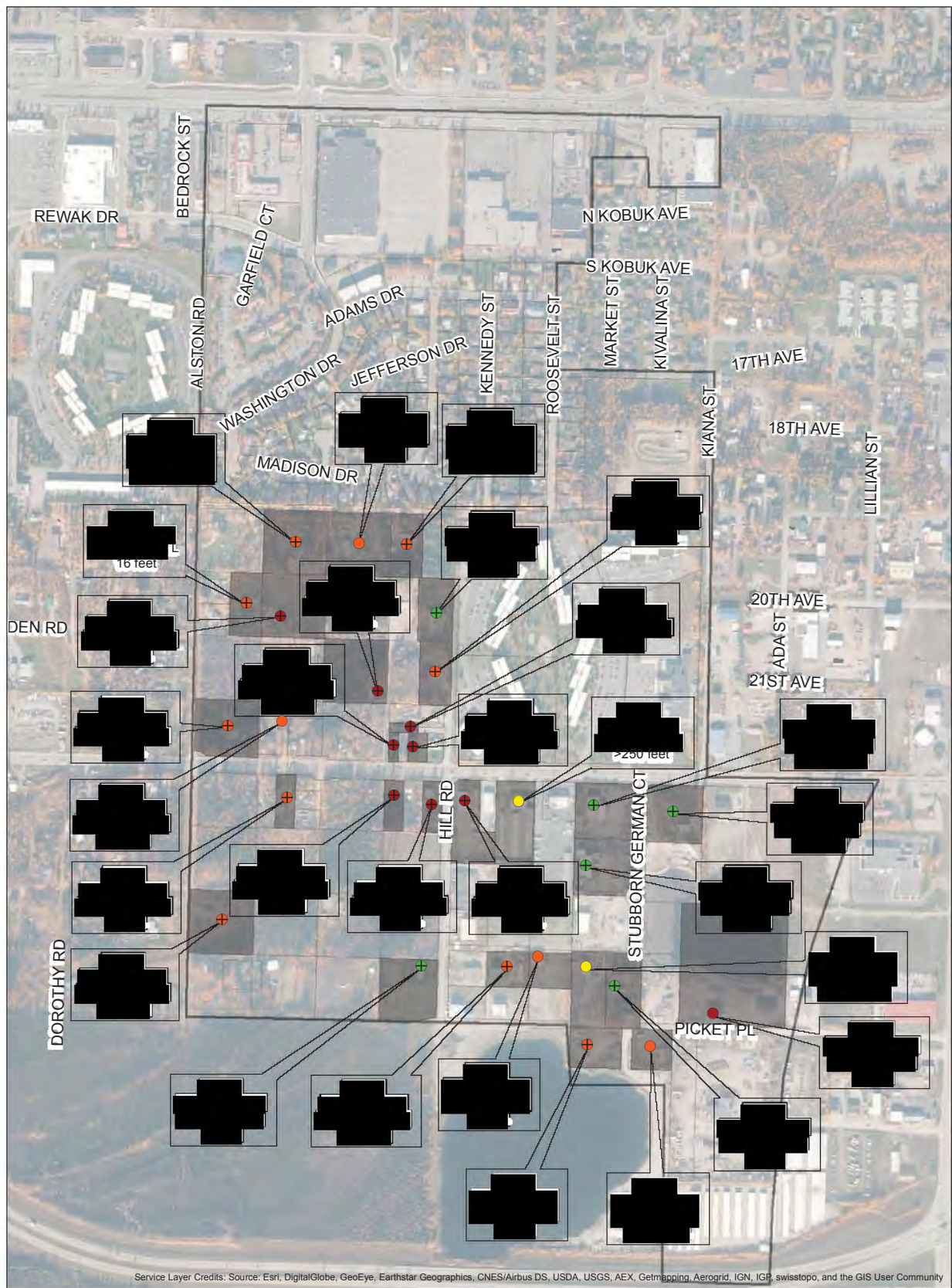
Regional Fire Training Center
Fairbanks, Alaska

**AREA 4
PANs, PFOS AND PFOA RESULTS,
AND WELL DEPTHS**

December 2016 31-1-11735-008

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FIG. 7



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

LEGEND

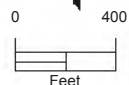
- Well Search Areas
- Parcel Sampled
- Parcel Not Sampled

* = Depth obtained from well log

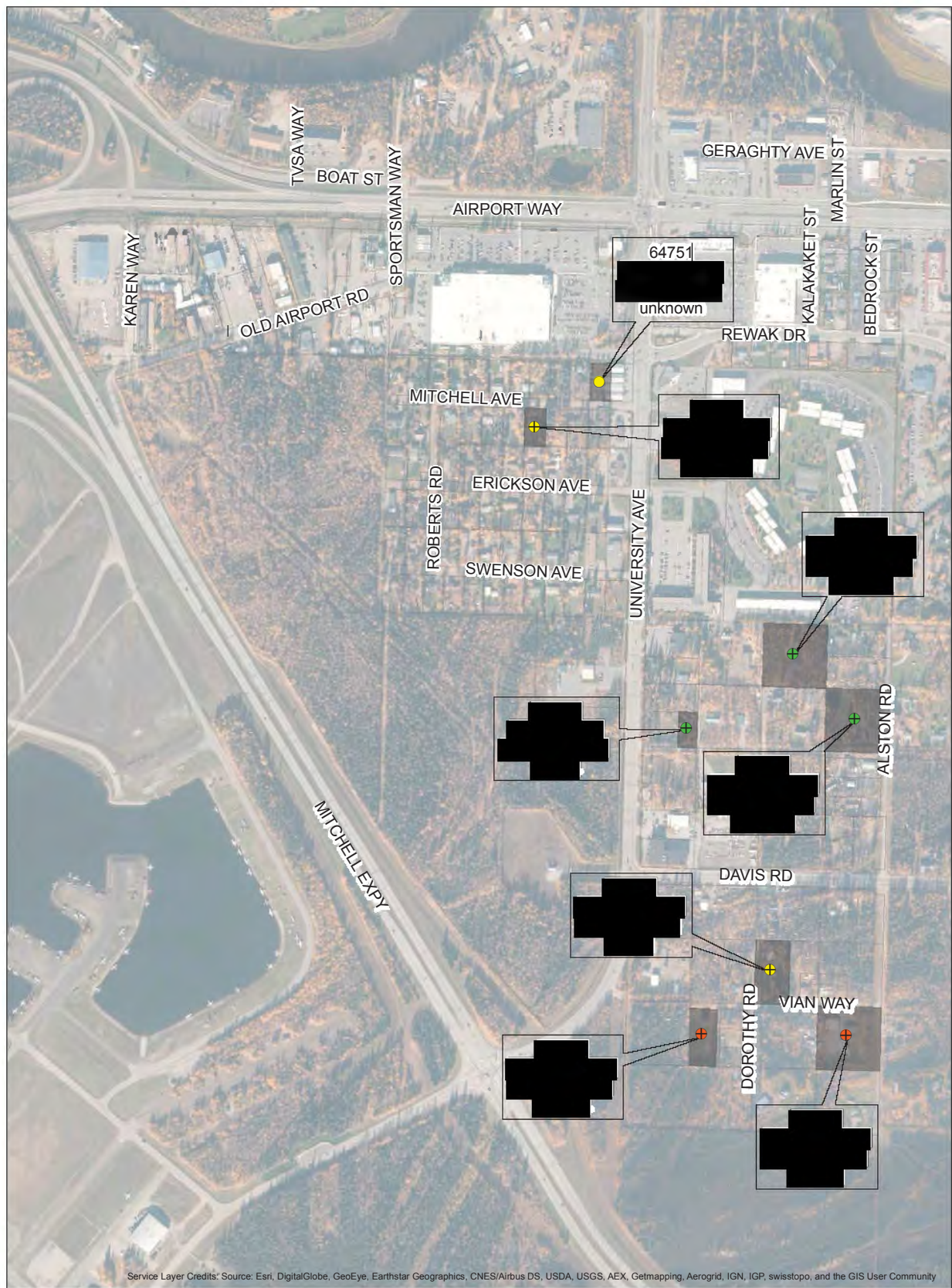
Combined (PFOS+PFOA) results

- <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



Regional Fire Training Center Fairbanks, Alaska	
AREA 5 PANs, PFOS AND PFOA RESULTS, AND WELL DEPTHS	
December 2016	31-1-11735-008
SHANNON & WILSON, INC. <small>GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS</small>	FIG. 8



LEGEND

Well Search Areas

Parcel Sampled

Parcel Not Sampled

* = Depth obtained from well log

Combined (PFOS+PFOA) results

<10 ng/L

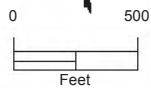
10 to 34.9 ng/L

35 to 64.9 ng/L

65 to 199 ng/L

≥200 ng/L

+ Category 1 Well



Regional Fire Training Center
Fairbanks, Alaska

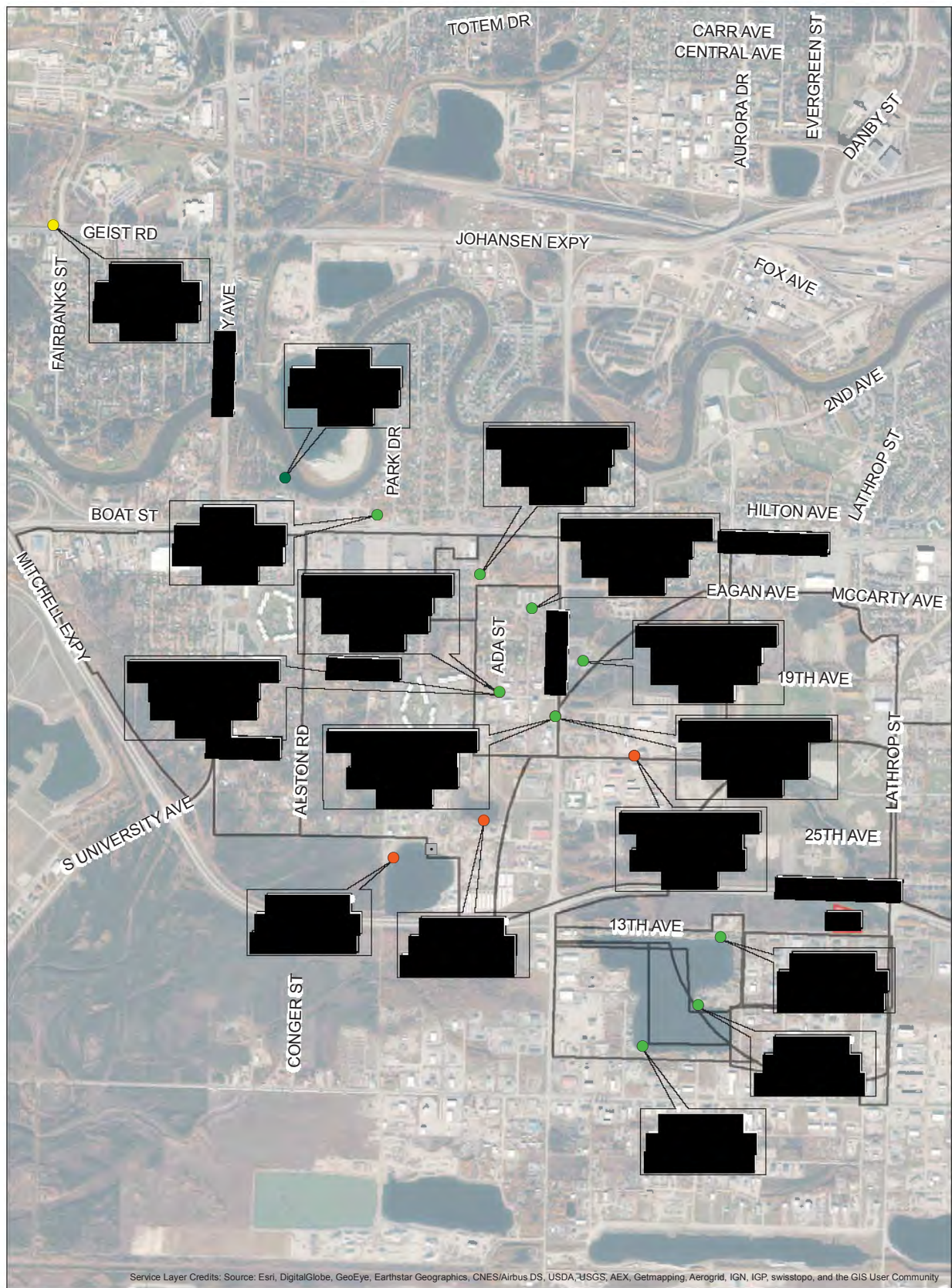
AREA 8 PANs, PFOS AND PFOA RESULTS, AND WELL DEPTHS

December 2016

31-1-11735-008

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 9



LEGEND

Well Search

RFTC Site

Garden Sample

* = Depth obtained from well log

Combined (PFOS+PFOA) results

<10 ng/L

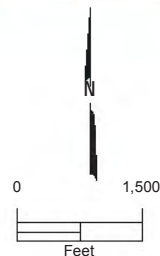
10 to 34.9 ng/L

35 to 64.9 ng/L

65 to 199 ng/L

≥200 ng/L

Sample ID
PFOA result
PFOS result
Well Depth



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Fairbanks, Alaska

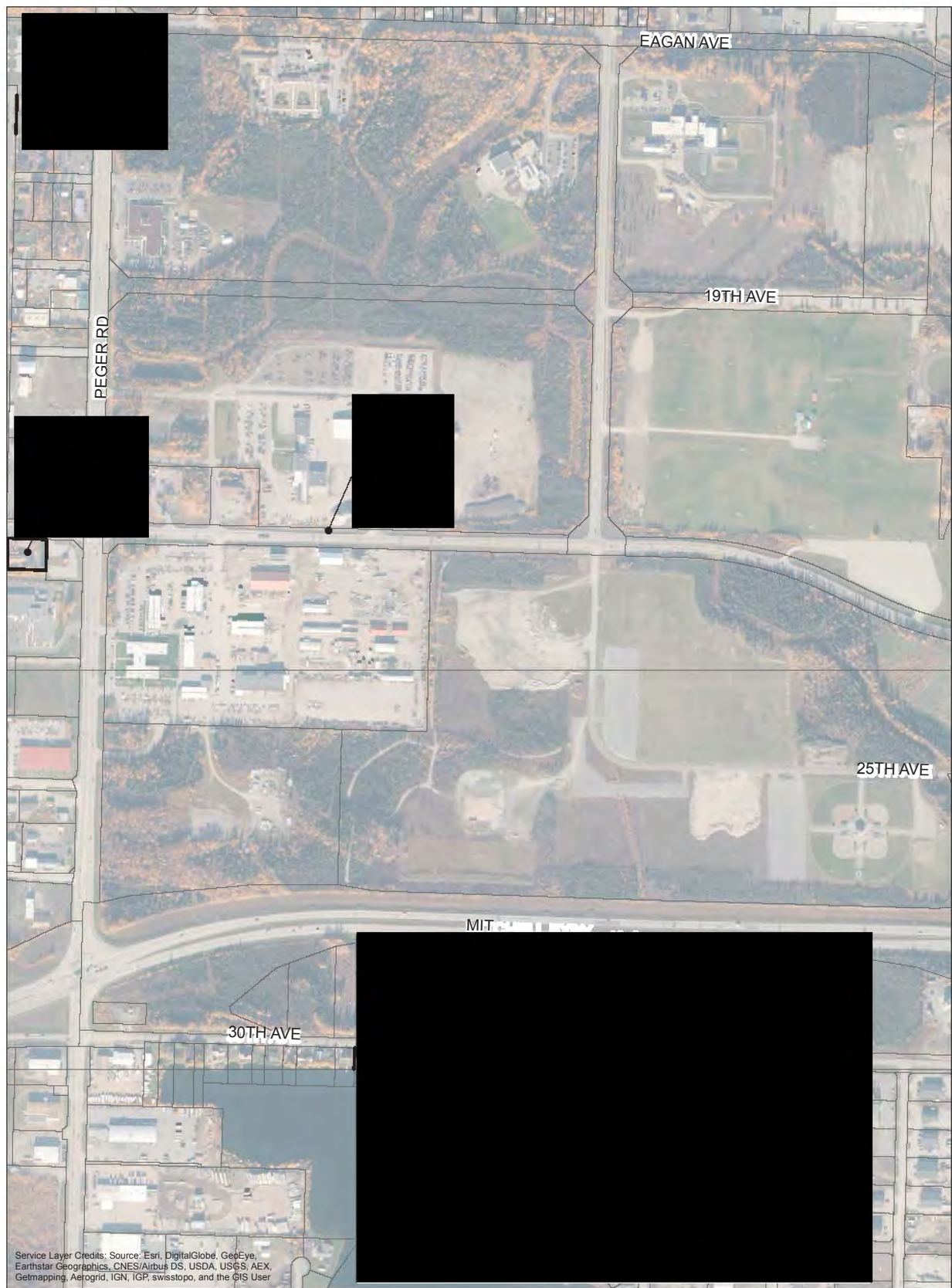
**SURFACE-WATER, MW,
AND OUTLIER WELL
PFOS AND PFOA RESULTS**

December 2016

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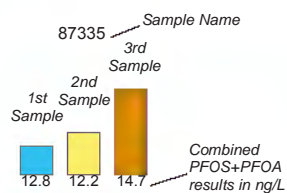
FIG. 10



LEGEND

- Parcel with quarterly samples
- Other parcels

QUARTERLY RESULTS



Regional Fire Training Center
Fairbanks, Alaska

QUARTERLY SAMPLING NETWORK RESULTS

December 2016

31-1-11735-008

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FIG. 11

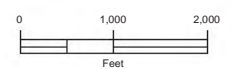


LEGEND

Percent combined (PFOS+PFOA)
out of total (sum of 6 UCMR PFCs):

- <25%
- 25 to 49.9%
- 50 to 74.9%
- 75 to 100%

■ RFTC Site



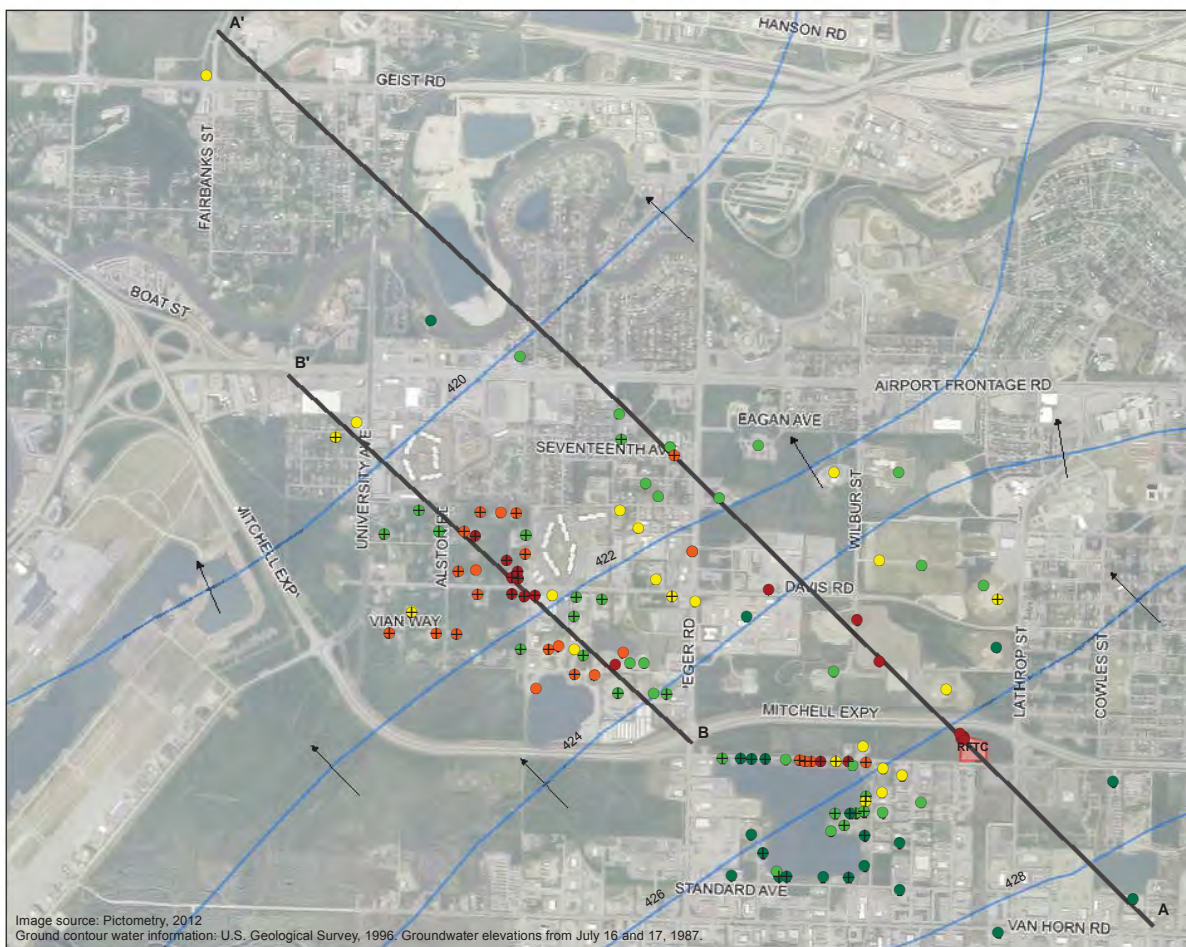
Regional Fire Training Center
Fairbanks, Alaska

PFC RATIOS DOWNGRADIENT OF RFTC

December 2016 31-1-11735-008

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ENVIRONMENTAL AND GEOGRAPHICAL 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

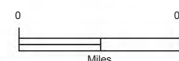
■ RFTC Site

— 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)



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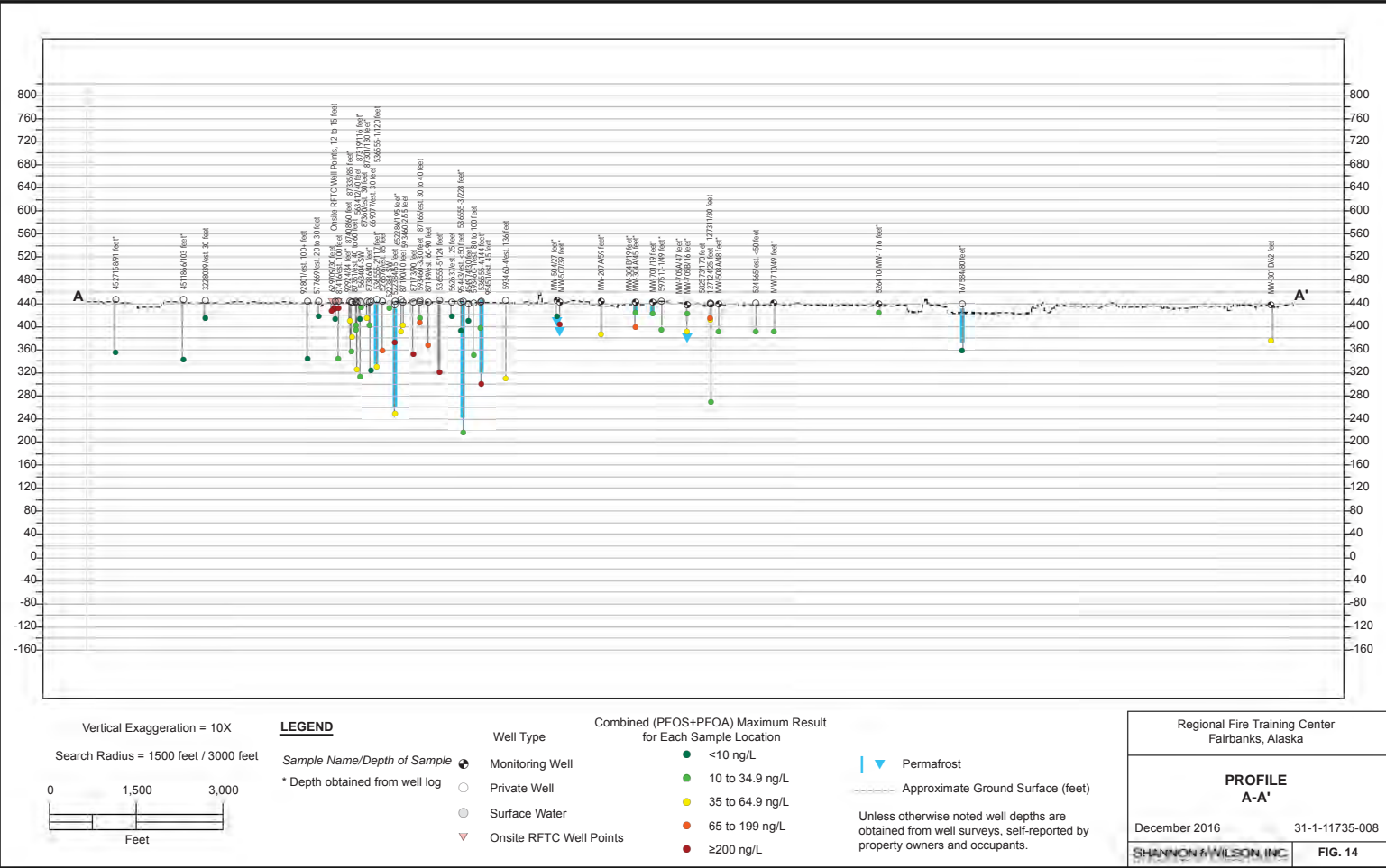
PROFILE LOCATIONS AND GROUNDWATER CONTOURS

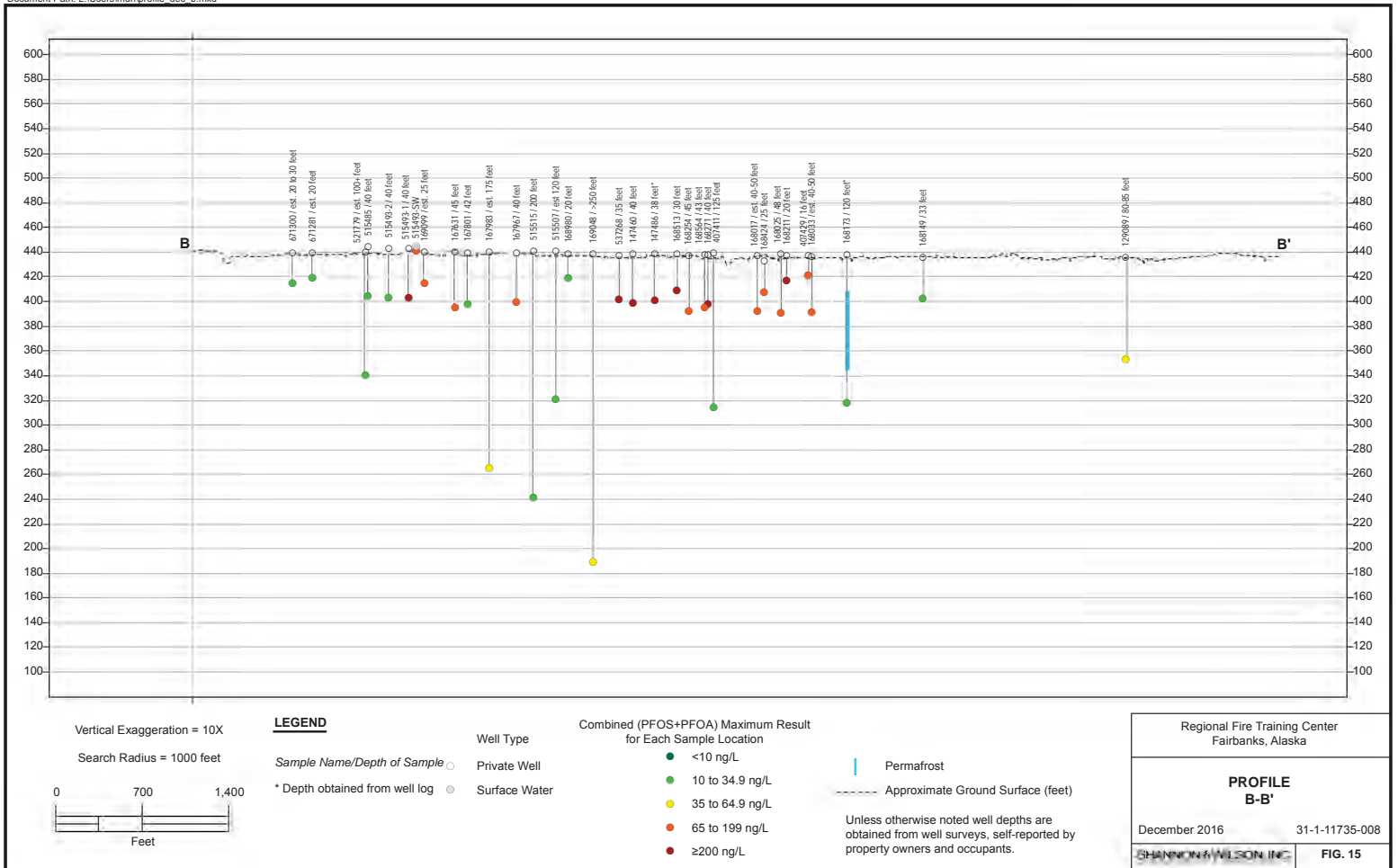
December 2016

31-1-11735-008

SHANNON & WILSON, INC.

FIG. 13





APPENDIX A
PUBLIC CORRESPONDENCE

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

June 6, 2016

Dear Property Owner:

The City of Fairbanks (City) was recently alerted to concentrations of perfluorinated compounds (PFCs) in the groundwater at the Regional Fire Training Center (RFTC) at 1710 30th Avenue. 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 recently discovered in the groundwater at the RFTC are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level.

The City is working with an environmental consulting firm, Shannon & Wilson Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near the RFTC to determine if these compounds are present above health advisory levels outside the RFTC property. In February Shannon & Wilson began contacting property owners and sampling private water-supply wells within approximately one-half mile of the RFTC. In April the well search area was expanded to include properties within approximately one mile to the west and northwest of the RFTC, and in June was further expanded to include additional properties to the southwest.

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 water system, although there may be private wells in use which predate the system's installation in those areas. In such cases, 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 PFC-contaminated water from the RFTC; and if anyone is found to be at risk, the City may be able to assist those property owners with connection to the water system 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

JUNE 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. The current well-search area consists of properties within approximately 1 mile to the west and northwest of the RFTC.

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 have been offered bottled water delivery at no cost.

PFCs are used in a large number of products ranging from non-stick cookware, fabric waterproofing compounds, 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.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

CONTACTS

For questions about well testing & study:

Shannon & Wilson Inc.

Julie Keener, Project Manager

Phone 907-458-3144

Email jak@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

Ali Hamade, Public Health Scientist

Phone 907-269-8086

Email ali.hamade@alaska.gov

For questions about RFTC & all other inquires:

City of Fairbanks, Engineering Division

Jackson Fox, City Engineer

Phone 907-459-6758

Email jcfox@ci.fairbanks.ak.us



800 Cushman Street
Fairbanks, AK 99701

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

July 29, 2016

Dear Property Owner or Occupant:

The City of Fairbanks would like to invite you to a community meeting on Thursday, August 11 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 a sample from the water-supply well at your home or business, or because your property borders Peger Lake. Other individuals who live in the RFTC area are also welcome to attend.

Regional Fire Training Center Community Meeting

Thursday, August 11

5:30 pm to 7:00 pm

Noel Wien Public Library

1215 Cowles Street

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), attached. PFOS is the perfluorinated compound detected in the highest concentrations in groundwater at the Regional Fire Training Center. The City is continuing to work with local environmental consulting firm Shannon & Wilson Inc. to assess the extent of PFOS-containing groundwater near the RFTC. At this meeting we will discuss the health effects of PFOS, summarize our work that has been to date, and answer any questions you may have.

CITY OF FAIRBANKS

Jackson C. Fox
City Engineer



July 27, 2016

Perfluorooctane Sulfonate (PFOS) Fact Sheet

The Alaska Department of Health and Social Services Section of Epidemiology, created this fact sheet to address community concerns about the recent discovery of perfluorooctane sulfonate (PFOS) at the Regional Fire Training Center (RFTC) in Fairbanks, Alaska at 1710 30th Avenue and in water wells nearby.

PFOS is a perfluorinated chemical (PFC). PFCs are anthropogenic (made by humans) chemicals that have been used for both residential and industrial purposes. PFCs are found in some products that resist fire, stains, grease, and water such as furniture and carpets, clothing, firefighting foams, and food packaging. PFCs are very persistent in the environment and can travel long distances in water and air.

The City of Fairbanks is currently providing drinking water to area residents whose well water has tested positive for PFOS at levels higher than the federal health advisory level. This fact sheet aims to inform readers about the characteristics of PFOS and its health effects.

What is PFOS?

Perfluorooctane sulfonate (PFOS) is an anthropogenic (made by humans) chemical manufactured in the United States until 2002. PFOS was used primarily in firefighting foam and as a coating additive to provide stain repellent or fire resistant properties to clothing, upholstery, carpet and furniture.

How might I be exposed to PFOS?

PFOS is widespread and persistent in the environment. It has been found in small quantities in water around the world and can be found at low concentrations in food. It has also been found in the blood or tissues of various species of wildlife such as fish and marine mammals.

PFOS is commonly found in the US population. The 1999-2000 National Health and Nutrition Examination Survey (NHANES) conducted by the US Centers for Disease Control and Prevention, showed PFCs could be found in more than 99 percent of a sample of the U.S. population. This indicated a

widespread exposure of the population to PFCs during the decades leading up to the study. The follow-up NHANES study conducted in 2011-2012 showed a decrease in PFC levels measured in the blood of the US population, suggesting a decrease in the general exposure. The main PFOS exposure pathways are ingestion of food or water, and inhalation of dust particles contaminated with PFOS.

Because it used to be widely employed in the making of commonly used products such as fire or stain-resistant materials, children may be exposed to small doses of PFOS within the home by hand-to-mouth contact.

Accidental releases of PFOS in the environment – resulting in water or soil contamination – can be sources of higher than usual exposure for the local populations if no protective measures are taken.

How can PFOS affect my health?

Current research has not clearly shown that PFOS exposure is related to specific illnesses. Studies on people who work with PFCs (which include PFOS), who generally have higher blood PFC levels than the rest of the population, have not consistently shown that long-term exposure to PFCs is linked to health problems. Some recent studies in animals suggest that exposure to PFCs above certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or infants during breastfeeding. Other studies found associations between exposure to PFCs and liver, immune, thyroid, and other effects (e.g., cholesterol changes). However these associations need to be confirmed by additional research. Some human epidemiology studies on people exposed to a PFC called perfluorooctanoic acid (PFOA) have also shown associations with kidney and testicular cancers but other investigations showed no cancer risk.

At this time, the scientific evidence is insufficient to determine if long-term exposure to PFOS might cause any particular disease. Therefore, we cannot determine if drinking your well water would be the cause of current or future health problems. The U.S. Environmental Protection Agency (US EPA) is still evaluating whether PFCs can cause cancer in humans.

Has the federal government made recommendations to protect human health?

In May 2016, the US EPA established a health advisory level of 0.07 micrograms PFOS per liter of water (µg/L) (or, 70 nanograms PFOS per liter of water, ng/L) as a basis to assess the potential risk of short and long-term exposure through drinking water. This health advisory accounts for the exposure to PFOS from other sources as well. In addition, if PFOA is also present in water, then the sum of both concentrations of PFOS and PFOA cannot be greater than 0.07 µg/L. The health advisory was developed to protect public health and was based on exposure of lactating women because of potential developmental effects

observed in toxicology studies of animals exposed to PFOS and PFOA. This health advisory was calculated to protect the most sensitive populations from the health effects of PFCs – fetuses and infants. Therefore, the health advisory is protective to other populations as well.

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

The Section of Epidemiology is working with the Alaska Department of Environmental Conservation (ADEC) and the Agency for Toxic Substances and Disease Registry to better understand the potential risks of exposure to PFOS from well water consumption by residents living near the RFTC. The Section of Epidemiology is exploring further steps to complement the body of data that was recently collected. The Section is also available as a resource for residents living near the RFTC to address any public-health related concerns and answer any health-related questions they may have.

Is it safe to shower, bathe or brush my teeth with my well water? And is it safe to swim in Peger Lake?

Yes. The potential risks of exposure from showering, bathing, or brushing your teeth are low because:

- PFOS is not significantly absorbed through the skin.
- PFOS is not easily transferred from water to air. This limits exposure by inhalation.
- Studies that tested the toxic effect of PFOS on animals show that PFOS is not a skin irritant, but that it can be mildly irritating to the eye. However, in these studies, the concentrations of PFOS were much larger than those that one could be exposed to while taking a shower, and therefore, are not relevant under residential conditions near the RFTC.

It is also safe to swim in Peger Lake for the same reasons mentioned above for bathing or showering with your well water. Concentrations of PFOS in water tested from Peger Lake are below the EPA health advisory level, therefore, accidental ingestion should not present an appreciable health risk.

Can my family or my pets drink my tap water?

If your test results are at or above EPA's health advisory level, the Section of Epidemiology recommends you do not drink your tap water or give it to your pets and other animals.

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

Yes. Cleaning surfaces or clothes with well water will only result in a small PFOS residue.

Can I breastfeed my child if I have been exposed to my well water?

Exposure through breast milk can occur but studies show that PFOS levels in breast milk are much lower than they are in the mother's blood. Breastfeeding benefits are very well documented and mothers who

breastfeed are encouraged to keep doing so. The new EPA health advisory for PFOS was calculated to protect the health of breastfeeding women and their nursing babies. If PFOS levels are found to be above the health advisory in your water, we recommend breastfeeding mothers use an alternate drinking water source and continue to breastfeed.

Is it safe to cook with my well water?

PFOS is resistant to heat and is not volatile. Therefore, heating or boiling will not destroy or remove it from the water.

- If the PFOS level in your well water exceeds US EPA's health advisory level, it is not recommended to use the water for cooking.
- You can still use well water to boil eggs as this will not result in any significant exposure.

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

Yes. A study by the Minnesota Department of Health showed that plants watered with PFOS-contaminated water absorbed very little of the chemical. Overall, the study concluded that the health benefits from growing and eating homegrown produce greatly outweigh any potential risks from low PFOS concentrations.

How can I tell how much PFOS is in my body?

The half-life of PFOS in the body (the time it takes for half the amount of a chemical to leave the body if no additional exposure occurs) is about five to six years. PFOS can be measured in the blood; however, the test is not routine. The presence of PFOS in the blood may indicate that you have been exposed to PFOS; however, that does not mean you will suffer adverse health effects. The body's natural elimination processes are the only way to remove PFOS from the body. Currently, there is no set value for what level of PFOS in blood may increase an individual's risk for adverse health effects.

How often will you check the quality of the water in my well?

The City of Fairbanks is in the process of checking wells in the potentially affected area. Monitoring frequency of those wells will depend on the concentration of PFOS in the well and the reported water usage. Once the City of Fairbanks has that information it will work with the ADEC to establish a long-term monitoring plan for the impacted wells until a permanent alternative water source is set up.

Where can I find more information about PFOS?

- You can contact the Alaska Section of Epidemiology at 907-269-8000 for information on the health effects of PFOS.
- You can contact the Alaska Department of Environmental Conservation at 907-451-2153 for information on well water testing.

You can also find additional information on the following websites:

- Alaska Environmental Public Health Program: <http://dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx>
- ATSDR's PFCs Toxicology Profile: <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=1116&tid=237>
- EPA's Fact Sheet on the PFOS and PFOA health advisories:
https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf

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

August 17, 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 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 expanded the well search in April and June 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 water system. 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 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

AUGUST 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 have been offered bottled water delivery at no cost, and most will be connected to municipal water this year.

PFCs are used in a large number of products ranging from non-stick cookware, fabric waterproofing compounds, 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

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Stacey Cooper, Health Assessor

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Division of Public Health Website:

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For questions about RFTC & all other inquiries:

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Phone 907-459-6758

Email jcfox@ci.fairbanks.ak.us

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

August 23, 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 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 expanded the well search in April and June 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 water system. Records from a previous search indicate that your property does not have a private water-supply well. If your property has an active well, please contact Shannon & Wilson. Enclosed 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

AUGUST 2016

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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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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.

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PFCs are used in a large number of products ranging from non-stick cookware, fabric waterproofing compounds, 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

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Email jcfox@ci.fairbanks.ak.us

800 Cushman Street
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Fax (907) 452-5913

September 8, 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 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 expanded the well search in April, June, and July 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 water system. 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

SEPTEMBER 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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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 have been offered bottled water delivery at no cost, and most will be connected to municipal water this year.

PFCs are used in a large number of products ranging from non-stick cookware, fabric waterproofing compounds, 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.

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For more information, please visit:
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CONTACTS

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Email jcfox@ci.fairbanks.ak.us



800 Cushman Street
Fairbanks, AK 99701

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

September 9, 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.

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CITY OF FAIRBANKS

Jackson C. Fox
City Engineer

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FACT SHEET – Well Testing for Perfluorinated Compounds

SEPTEMBER 2016

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800 Cushman Street
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Fax (907) 452-5913

October 11, 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 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

OCTOBER 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 have been offered bottled water delivery at no cost.

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

October 11, 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.

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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

OCTOBER 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.

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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 have been offered bottled water delivery at no cost.

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

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



Example indoor private well sample location (marked with flagging tape), spigot at the base of the pressure tank at 2616 Pacific Place (July 6, 2016).



Example MW sample location, ADOT&PF MW-705A and MW-705B on Ada Street (July 6, 2016).



Example outdoor private well sample location (marked with flagging tape), outdoor spigot at 2020 Van Horn Court (July 6, 2016).



Garden at 2915 Picket Place, facing west-northwest towards King gravel pit lake (October 6, 2016).



Freshly dug potatoes in garden at 2915 Picket Place, view from above (October 6, 2010).

APPENDIX E

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

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: 320-19777-1

TestAmerica Sample Delivery Group: 31-1-11735-005

Client Project/Site: Reg Fire Train Center

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Julie Keener



Authorized for release by:

7/19/2016 9:45:39 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: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

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.
▫	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: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Job ID: 320-19777-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-19777-1

Receipt

The samples were received on 6/23/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4° C.

LCMS

Method(s) PFAS: The following 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": 87249 (320-19777-1), 87149 (320-19777-2), 106003 (320-19777-3), 471615 (320-19777-4), 471551 (320-19777-5), 471551-SW (320-19777-6), 577669 (320-19777-7), 563404-SW (320-19777-8), 522384-SW (320-19777-9), 105961 (320-19777-10), 650271 (320-19777-11), (LCS 320-118100/2-A), (LCSD 320-118100/3-A) and (MB 320-118100/1-A)

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/sample duplicate (MS/MSD/DUP) associated with analytical batch 320-118100.

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: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 87249

Lab Sample ID: 320-19777-1

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)	17		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	4.5		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: 87149

Lab Sample ID: 320-19777-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.7		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	17		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.8		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)	62		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 106003

Lab Sample ID: 320-19777-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.2		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.0	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	2.1		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: 471615

Lab Sample ID: 320-19777-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.99	J	2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	0.96	J	2.0	0.75	ng/L	1			PFAS	Total/NA

Client Sample ID: 471551

Lab Sample ID: 320-19777-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.6	J	2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	1.1	J	2.0	0.75	ng/L	1			PFAS	Total/NA

Client Sample ID: 471551-SW

Lab Sample ID: 320-19777-6

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)	6.7		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.1		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	3.2		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.9		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 577669

Lab Sample ID: 320-19777-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.0	J	2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	0.96	J	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
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 563404-SW

Lab Sample ID: 320-19777-8

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)	6.8		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)	3.0		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.6		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 522384-SW

Lab Sample ID: 320-19777-9

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			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.0		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)	3.1		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.74	J	2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 105961

Lab Sample ID: 320-19777-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.98	J	2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.2		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	1.2	J	2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 650271

Lab Sample ID: 320-19777-11

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 87249
Date Collected: 06/20/16 12:20
Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-1
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		07/15/16 14:04	07/18/16 11:50	1
Perfluorohexanesulfonic acid (PFHxS)	17		2.0	0.87	ng/L		07/15/16 14:04	07/18/16 11:50	1
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L		07/15/16 14:04	07/18/16 11:50	1
Perfluorooctanoic acid (PFOA)	4.5		2.0	0.75	ng/L		07/15/16 14:04	07/18/16 11:50	1
Perfluorooctanesulfonic acid (PFOS)	71		2.0	1.3	ng/L		07/15/16 14:04	07/18/16 11:50	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/18/16 11:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	130		25 - 150				07/15/16 14:04	07/18/16 11:50	1
13C4-PFHxS	119		25 - 150				07/15/16 14:04	07/18/16 11:50	1
13C4 PFOA	121		25 - 150				07/15/16 14:04	07/18/16 11:50	1
13C4 PFOS	129		25 - 150				07/15/16 14:04	07/18/16 11:50	1
13C5 PFNA	126		25 - 150				07/15/16 14:04	07/18/16 11:50	1

Client Sample ID: 87149
Date Collected: 06/20/16 12:30
Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-2
Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.7		2.0	0.92	ng/L		07/15/16 14:04	07/17/16 12:12	1
Perfluorohexanesulfonic acid (PFHxS)	17		2.0	0.87	ng/L		07/15/16 14:04	07/17/16 12:12	1
Perfluoroheptanoic acid (PFHpA)	2.8		2.0	0.80	ng/L		07/15/16 14:04	07/17/16 12:12	1
Perfluorooctanoic acid (PFOA)	5.0		2.0	0.75	ng/L		07/15/16 14:04	07/17/16 12:12	1
Perfluorooctanesulfonic acid (PFOS)	62		2.0	1.3	ng/L		07/15/16 14:04	07/17/16 12:12	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/17/16 12:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	118		25 - 150				07/15/16 14:04	07/17/16 12:12	1
13C4-PFHxS	95		25 - 150				07/15/16 14:04	07/17/16 12:12	1
13C4 PFOA	111		25 - 150				07/15/16 14:04	07/17/16 12:12	1
13C4 PFOS	123		25 - 150				07/15/16 14:04	07/17/16 12:12	1
13C5 PFNA	111		25 - 150				07/15/16 14:04	07/17/16 12:12	1

Client Sample ID: 106003
Date Collected: 06/20/16 13:43
Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-3
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		07/15/16 14:04	07/17/16 12:31	1
Perfluorohexanesulfonic acid (PFHxS)	2.2		2.0	0.87	ng/L		07/15/16 14:04	07/17/16 12:31	1
Perfluoroheptanoic acid (PFHpA)	1.0 J		2.0	0.80	ng/L		07/15/16 14:04	07/17/16 12:31	1
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.75	ng/L		07/15/16 14:04	07/17/16 12:31	1
Perfluorooctanesulfonic acid (PFOS)	3.3		2.0	1.3	ng/L		07/15/16 14:04	07/17/16 12:31	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 106003

Date Collected: 06/20/16 13:43

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-3

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/17/16 12:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	122		25 - 150				07/15/16 14:04	07/17/16 12:31	1
13C4-PFHpA	102		25 - 150				07/15/16 14:04	07/17/16 12:31	1
13C4 PFOA	116		25 - 150				07/15/16 14:04	07/17/16 12:31	1
13C4 PFOS	125		25 - 150				07/15/16 14:04	07/17/16 12:31	1
13C5 PFNA	120		25 - 150				07/15/16 14:04	07/17/16 12:31	1

Client Sample ID: 471615

Date Collected: 06/20/16 14:10

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-4

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.99	J	2.0	0.92	ng/L		07/15/16 14:04	07/18/16 12:30	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.0	0.87	ng/L		07/15/16 14:04	07/18/16 12:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/15/16 14:04	07/18/16 12:30	1
Perfluorooctanoic acid (PFOA)	0.96	J	2.0	0.75	ng/L		07/15/16 14:04	07/18/16 12:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		07/15/16 14:04	07/18/16 12:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/18/16 12:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	137		25 - 150				07/15/16 14:04	07/18/16 12:30	1
13C4-PFHpA	123		25 - 150				07/15/16 14:04	07/18/16 12:30	1
13C4 PFOA	126		25 - 150				07/15/16 14:04	07/18/16 12:30	1
13C4 PFOS	134		25 - 150				07/15/16 14:04	07/18/16 12:30	1
13C5 PFNA	133		25 - 150				07/15/16 14:04	07/18/16 12:30	1

Client Sample ID: 471551

Date Collected: 06/20/16 16:00

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-5

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		07/15/16 14:04	07/17/16 13:11	1
Perfluorohexanesulfonic acid (PFHxS)	1.6	J	2.0	0.87	ng/L		07/15/16 14:04	07/17/16 13:11	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/15/16 14:04	07/17/16 13:11	1
Perfluorooctanoic acid (PFOA)	1.1	J	2.0	0.75	ng/L		07/15/16 14:04	07/17/16 13:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		07/15/16 14:04	07/17/16 13:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/17/16 13:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	123		25 - 150				07/15/16 14:04	07/17/16 13:11	1
13C4-PFHpA	108		25 - 150				07/15/16 14:04	07/17/16 13:11	1
13C4 PFOA	118		25 - 150				07/15/16 14:04	07/17/16 13:11	1
13C4 PFOS	126		25 - 150				07/15/16 14:04	07/17/16 13:11	1
13C5 PFNA	123		25 - 150				07/15/16 14:04	07/17/16 13:11	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 471551-SW

Date Collected: 06/20/16 16:15

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-6

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		07/15/16 14:04	07/17/16 13:31	1
Perfluorohexanesulfonic acid (PFHxS)	6.7		2.0	0.87	ng/L		07/15/16 14:04	07/17/16 13:31	1
Perfluoroheptanoic acid (PFHpA)	2.1		2.0	0.80	ng/L		07/15/16 14:04	07/17/16 13:31	1
Perfluorooctanoic acid (PFOA)	3.2		2.0	0.75	ng/L		07/15/16 14:04	07/17/16 13:31	1
Perfluorooctanesulfonic acid (PFOS)	6.9		2.0	1.3	ng/L		07/15/16 14:04	07/17/16 13:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/17/16 13:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	121		25 - 150				07/15/16 14:04	07/17/16 13:31	1
13C4-PFHxS	107		25 - 150				07/15/16 14:04	07/17/16 13:31	1
13C4 PFOA	113		25 - 150				07/15/16 14:04	07/17/16 13:31	1
13C4 PFOS	125		25 - 150				07/15/16 14:04	07/17/16 13:31	1
13C5 PFNA	118		25 - 150				07/15/16 14:04	07/17/16 13:31	1

Client Sample ID: 577669

Date Collected: 06/20/16 16:44

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-7

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		07/15/16 14:04	07/18/16 13:30	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	J	2.0	0.87	ng/L		07/15/16 14:04	07/18/16 13:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/15/16 14:04	07/18/16 13:30	1
Perfluorooctanoic acid (PFOA)	0.96	J	2.0	0.75	ng/L		07/15/16 14:04	07/18/16 13:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		07/15/16 14:04	07/18/16 13:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/18/16 13:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	131		25 - 150				07/15/16 14:04	07/18/16 13:30	1
13C4-PFHxS	122		25 - 150				07/15/16 14:04	07/18/16 13:30	1
13C4 PFOA	125		25 - 150				07/15/16 14:04	07/18/16 13:30	1
13C4 PFOS	134		25 - 150				07/15/16 14:04	07/18/16 13:30	1
13C5 PFNA	132		25 - 150				07/15/16 14:04	07/18/16 13:30	1

Client Sample ID: 563404-SW

Date Collected: 06/20/16 16:50

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-8

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		07/15/16 14:04	07/17/16 14:51	1
Perfluorohexanesulfonic acid (PFHxS)	6.8		2.0	0.87	ng/L		07/15/16 14:04	07/17/16 14:51	1
Perfluoroheptanoic acid (PFHpA)	2.0		2.0	0.80	ng/L		07/15/16 14:04	07/17/16 14:51	1
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L		07/15/16 14:04	07/17/16 14:51	1
Perfluorooctanesulfonic acid (PFOS)	7.6		2.0	1.3	ng/L		07/15/16 14:04	07/17/16 14:51	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/17/16 14:51	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 563404-SW

Date Collected: 06/20/16 16:50

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-8

Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	125		25 - 150	07/15/16 14:04	07/17/16 14:51	1
13C4-PFHpa	108		25 - 150	07/15/16 14:04	07/17/16 14:51	1
13C4 PFOA	122		25 - 150	07/15/16 14:04	07/17/16 14:51	1
13C4 PFOS	134		25 - 150	07/15/16 14:04	07/17/16 14:51	1
13C5 PFNA	126		25 - 150	07/15/16 14:04	07/17/16 14:51	1

Client Sample ID: 522384-SW

Date Collected: 06/20/16 17:15

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-9

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.6	J	2.0	0.92	ng/L		07/15/16 14:04	07/17/16 15:11	1
Perfluorohexanesulfonic acid (PFHxS)	7.0		2.0	0.87	ng/L		07/15/16 14:04	07/17/16 15:11	1
Perfluoroheptanoic acid (PFHpA)	2.0		2.0	0.80	ng/L		07/15/16 14:04	07/17/16 15:11	1
Perfluorooctanoic acid (PFOA)	3.1		2.0	0.75	ng/L		07/15/16 14:04	07/17/16 15:11	1
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L		07/15/16 14:04	07/17/16 15:11	1
Perfluorononanoic acid (PFNA)	0.74	J	2.0	0.65	ng/L		07/15/16 14:04	07/17/16 15:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	127		25 - 150				07/15/16 14:04	07/17/16 15:11	1
13C4-PFHpa	107		25 - 150				07/15/16 14:04	07/17/16 15:11	1
13C4 PFOA	113		25 - 150				07/15/16 14:04	07/17/16 15:11	1
13C4 PFOS	135		25 - 150				07/15/16 14:04	07/17/16 15:11	1
13C5 PFNA	123		25 - 150				07/15/16 14:04	07/17/16 15:11	1

Client Sample ID: 105961

Date Collected: 06/21/16 14:38

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-10

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.98	J	2.0	0.92	ng/L		07/15/16 14:04	07/17/16 15:31	1
Perfluorohexanesulfonic acid (PFHxS)	2.2		2.0	0.87	ng/L		07/15/16 14:04	07/17/16 15:31	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/15/16 14:04	07/17/16 15:31	1
Perfluorooctanoic acid (PFOA)	1.2	J	2.0	0.75	ng/L		07/15/16 14:04	07/17/16 15:31	1
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	1.3	ng/L		07/15/16 14:04	07/17/16 15:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/17/16 15:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	122		25 - 150				07/15/16 14:04	07/17/16 15:31	1
13C4-PFHpA	106		25 - 150				07/15/16 14:04	07/17/16 15:31	1
13C4 PFOA	116		25 - 150				07/15/16 14:04	07/17/16 15:31	1
13C4 PFOS	125		25 - 150				07/15/16 14:04	07/17/16 15:31	1
13C5 PFNA	119		25 - 150				07/15/16 14:04	07/17/16 15:31	1

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 650271

Date Collected: 06/21/16 15:22

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-11

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		07/15/16 14:04	07/17/16 15:51	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/15/16 14:04	07/17/16 15:51	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/15/16 14:04	07/17/16 15:51	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		07/15/16 14:04	07/17/16 15:51	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		07/15/16 14:04	07/17/16 15:51	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/15/16 14:04	07/17/16 15:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	131		25 - 150				07/15/16 14:04	07/17/16 15:51	1
13C4-PFHpA	117		25 - 150				07/15/16 14:04	07/17/16 15:51	1
13C4 PFOA	123		25 - 150				07/15/16 14:04	07/17/16 15:51	1
13C4 PFOS	136		25 - 150				07/15/16 14:04	07/17/16 15:51	1
13C5 PFNA	130		25 - 150				07/15/16 14:04	07/17/16 15:51	1

Isotope Dilution Summary

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

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)
320-19777-1	87249	130	119	121	129	126
320-19777-2	87149	118	95	111	123	111
320-19777-3	106003	122	102	116	125	120
320-19777-4	471615	137	123	126	134	133
320-19777-5	471551	123	108	118	126	123
320-19777-6	471551-SW	121	107	113	125	118
320-19777-7	577669	131	122	125	134	132
320-19777-8	563404-SW	125	108	122	134	126
320-19777-9	522384-SW	127	107	113	135	123
320-19777-10	105961	122	106	116	125	119
320-19777-11	650271	131	117	123	136	130
LCS 320-118100/2-A	Lab Control Sample	124	99	112	123	109
LCSD 320-118100/3-A	Lab Control Sample Dup	118	92	96	120	101
MB 320-118100/1-A	Method Blank	123	96	112	127	111

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: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-118100/1-A

Matrix: Water

Analysis Batch: 118250

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 118100

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.ILorobLtanelsLi.onic aci6 4PF8Sf	uD		2d	0d2	ng/		07/15/1N1):0)	07/17/1N10:52	1
Per.ILorohepanesLi.onic aci6 4PFHpSf	uD		2d	0d7	ng/		07/15/1N1):0)	07/17/1N10:52	1
Per.ILoroheQanoic aci6 4PFHOAf	uD		2d	0d0	ng/		07/15/1N1):0)	07/17/1N10:52	1
Per.ILorooctanoic aci6 4PFx Af	uD		2d	0d5	ng/		07/15/1N1):0)	07/17/1N10:52	1
Per.ILorooctanesLi.onic aci6 4PFx Sf	uD		2d	1d8	ng/		07/15/1N1):0)	07/17/1N10:52	1
Per.ILorononanoic aci6 4PFu Af	uD		2d	0d5	ng/		07/15/1N1):0)	07/17/1N10:52	1

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	123		20 510-	- 7/10/16 1: 4 :	- 7/17/16 1- 42	1
13p : 5PFHA9	06		20 510-	- 7/10/16 1: 4 :	- 7/17/16 1- 42	1
13p : PFO9	112		20 510-	- 7/10/16 1: 4 :	- 7/17/16 1- 42	1
13p : PFOS	127		20 510-	- 7/10/16 1: 4 :	- 7/17/16 1- 42	1
13p 0 PFN9	111		20 510-	- 7/10/16 1: 4 :	- 7/17/16 1- 42	1

Lab Sample ID: LCS 320-118100/2-A

Matrix: Water

Analysis Batch: 118250

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 118100

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Per.ILorobLtanelsLi.onic aci6 4PF8Sf	17d	1Nd		ng/		91	55 - 1) 7
Per.ILorohepanesLi.onic aci6 4PFHpSf	1Bd	17d		ng/		9N	5B - 13B
Per.ILoroheQanoic aci6 4PFHOAf	20d	19d		ng/		9N	N3 - 135
Per.ILorooctanoic aci6 4PFx Af	20d	20d		ng/		101	N3 - 1) 1
Per.ILorooctanesLi.onic aci6 4PFx Sf	1Bd	1Bd		ng/		99	) 7 - 1N2
Per.ILorononanoic aci6 4PFu Af	20d	19d		ng/		97	71 - 1) 0

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	12:		20 510-
13p : 5PFHA9	00		20 510-
13p : PFO9	112		20 510-
13p : PFOS	123		20 510-
13p 0 PFN9	1- C		20 510-

Lab Sample ID: LCSD 320-118100/3-A

Matrix: Water

Analysis Batch: 118250

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 118100

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Per.ILorobLtanelsLi.onic aci6 4PF8Sf	17d	1Nd		ng/		93	55 - 1) 7	2	30
Per.ILorohepanesLi.onic aci6 4PFHpSf	1Bd	17d		ng/		9B	5B - 13B	2	30
Per.ILoroheQanoic aci6 4PFHOAf	20d	1Bd		ng/		93	N3 - 135	3	30
Per.ILorooctanoic aci6 4PFx Af	20d	20d		ng/		100	N3 - 1) 1	1	30
Per.ILorooctanesLi.onic aci6 4PFx Sf	1Bd	1Nd		ng/		90	) 7 - 1N2	9	30
Per.ILorononanoic aci6 4PFu Af	20d	1Bd		ng/		93	71 - 1) 0	5	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
18O2 PFHxS	118		20 510-
13p : PFHA9	C2		20 510-
13p : PFO9	C6		20 510-
13p : PFOS	12-		20 510-
13p 0 PFN9	1- 1		20 510-

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QC Association Summary

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

LCMS

Prep Batch: 118100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19777-1	87249	Total/NA	Water	PFAS Prep	
320-19777-2	87149	Total/NA	Water	PFAS Prep	
320-19777-3	106003	Total/NA	Water	PFAS Prep	
320-19777-4	471615	Total/NA	Water	PFAS Prep	
320-19777-5	471551	Total/NA	Water	PFAS Prep	
320-19777-6	471551-SW	Total/NA	Water	PFAS Prep	
320-19777-7	577669	Total/NA	Water	PFAS Prep	
320-19777-8	563404-SW	Total/NA	Water	PFAS Prep	
320-19777-9	522384-SW	Total/NA	Water	PFAS Prep	
320-19777-10	105961	Total/NA	Water	PFAS Prep	
320-19777-11	650271	Total/NA	Water	PFAS Prep	
MB 320-118100/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-118100/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-118100/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 118250

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19777-2	87149	Total/NA	Water	PFAS	118100
320-19777-3	106003	Total/NA	Water	PFAS	118100
320-19777-5	471551	Total/NA	Water	PFAS	118100
320-19777-6	471551-SW	Total/NA	Water	PFAS	118100
320-19777-8	563404-SW	Total/NA	Water	PFAS	118100
320-19777-9	522384-SW	Total/NA	Water	PFAS	118100
320-19777-10	105961	Total/NA	Water	PFAS	118100
320-19777-11	650271	Total/NA	Water	PFAS	118100
MB 320-118100/1-A	Method Blank	Total/NA	Water	PFAS	118100
LCS 320-118100/2-A	Lab Control Sample	Total/NA	Water	PFAS	118100
LCSD 320-118100/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	118100

Analysis Batch: 118330

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19777-1	87249	Total/NA	Water	PFAS	118100
320-19777-4	471615	Total/NA	Water	PFAS	118100
320-19777-7	577669	Total/NA	Water	PFAS	118100

Lab Chronicle

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 87249

Date Collected: 06/20/16 12:20

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-1

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118330	07/18/16 11:50	CBW	TAL SAC

Client Sample ID: 87149

Date Collected: 06/20/16 12:30

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-2

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118250	07/17/16 12:12	CBW	TAL SAC

Client Sample ID: 106003

Date Collected: 06/20/16 13:43

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-3

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118250	07/17/16 12:31	CBW	TAL SAC

Client Sample ID: 471615

Date Collected: 06/20/16 14:10

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-4

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118330	07/18/16 12:30	CBW	TAL SAC

Client Sample ID: 471551

Date Collected: 06/20/16 16:00

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-5

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118250	07/17/16 13:11	CBW	TAL SAC

Client Sample ID: 471551-SW

Date Collected: 06/20/16 16:15

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-6

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118250	07/17/16 13:31	CBW	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: Shannon & Wilson
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Client Sample ID: 577669

Date Collected: 06/20/16 16:44

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-7

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118330	07/18/16 13:30	CBW	TAL SAC

Client Sample ID: 563404-SW

Date Collected: 06/20/16 16:50

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-8

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118250	07/17/16 14:51	CBW	TAL SAC

Client Sample ID: 522384-SW

Date Collected: 06/20/16 17:15

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-9

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118250	07/17/16 15:11	CBW	TAL SAC

Client Sample ID: 105961

Date Collected: 06/21/16 14:38

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-10

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118250	07/17/16 15:31	CBW	TAL SAC

Client Sample ID: 650271

Date Collected: 06/21/16 15:22

Date Received: 06/23/16 09:30

Lab Sample ID: 320-19777-11

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			1.0 mL	1.66 mL	118100	07/15/16 14:04	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118250	07/17/16 15:51	CBW	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: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

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	08-11-16 *
Arkansas DEQ	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-17
Colorado	State Program	8	CA00044	08-31-16
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	07-31-16 *
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	07-31-16 *
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	10-31-16
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-16
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
Project/Site: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

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: Reg Fire Train Center

TestAmerica Job ID: 320-19777-1
SDG: 31-1-11735-005

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-19777-1	87249	Water	06/20/16 12:20	06/23/16 09:30
320-19777-2	87149	Water	06/20/16 12:30	06/23/16 09:30
320-19777-3	106003	Water	06/20/16 13:43	06/23/16 09:30
320-19777-4	471615	Water	06/20/16 14:10	06/23/16 09:30
320-19777-5	471551	Water	06/20/16 16:00	06/23/16 09:30
320-19777-6	471551-SW	Water	06/20/16 16:15	06/23/16 09:30
320-19777-7	577669	Water	06/20/16 16:44	06/23/16 09:30
320-19777-8	563404-SW	Water	06/20/16 16:50	06/23/16 09:30
320-19777-9	522384-SW	Water	06/20/16 17:15	06/23/16 09:30
320-19777-10	105961	Water	06/21/16 14:38	06/23/16 09:30
320-19777-11	650271	Water	06/21/16 15:22	06/23/16 09:30



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CHAIN-OF-CUSTODY RECORD

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(509) 946-6309

Page 1 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	PFCs (WS-11C-0025)	Total Number of Containers	Remarks/Matrix
87249		1230	6/20/16	X	2		2	Groundwater
87149		1230	6/20/16	X	2		2	
106003		1343	6/20/16	X	2		2	
471115		1410	6/20/16	X	2		2	
471551		1600	6/20/16	X	2		2	
471551-SW		1615	6/20/16	X	2		2	
577669		1644	6/20/16	X	2		2	
563404-SW		1650	6/20/16	X	2		2	
522384-SW		1715	6/20/16	X	2		2	
105901		1438	6/21/16	X	2		2	



320-19777 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735-05</u>		Total Number of Containers: <u>22</u>		Signature: <u>Tiffany Green</u> Time: <u>0800</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>Reg Fire Train (Leak)</u>		GDE Seals/Intact? Y/N/NA		Printed Name: <u>Tiffany Green</u> Date: <u>6/22/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN/JAK</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>							
Sampler: <u>TXG</u>		(attach shipping bill, if any)							
Instructions									
Requested Turnaround Time: <u>Standard</u>									
Special Instructions: <u>Please notify upon arrival of shipment</u>									
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>Wesley Shackley</u> Time: <u>0130</u>		Signature: _____ Time: _____		Signature: _____ Time: _____					
Printed Name: <u>Wesley Shackley</u> Date: <u>6/23/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____					
Company: <u>SH&W</u>		Company: _____		Company: _____					

No. 33868





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CHAIN-OF-CUSTODY RECORD

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
650271		1522	6/23/16	X	0	PFCs WS-LC-00285	2	Groundwater

Project Information Project Number: _____ Project Name: _____ Contact: _____ Ongoing Project? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Sampler: _____		Sample Receipt Total Number of Containers: _____ COC Seals/Intact? Y/N/NA: _____ Received Good Cond./Cold: _____ Delivery Method: _____ (attach shipping bill, if any)		Relinquished By: 1. Signature: _____ Time: 0800 Printed Name: _____ Date: 6/23/16 Company: Shannon & Wilson		Relinquished By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Relinquished By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____	
Instructions Requested Turnaround Time: _____ Special Instructions: _____		Received By: 1. Signature: _____ Time: 6430 Printed Name: Wesley Sheskey Company: T&W		Received By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 4. 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

No. **33863**



Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-19777-1

SDG Number: 31-1-11735-005

Login Number: 19777

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	
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:

- 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:

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:

- 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.

- 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.

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

Comments:

No, 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 notes there was not enough sample volume to analyze MS/MSD samples.

- c. Were all corrective actions documented?

☐Yes ☐No ☒NA (Please explain.)

Comments:

N/A; no corrective actions were required.

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

Comments:

The data quality and usability were not affected.

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:

N/A; no soil samples were 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 level 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:

N/A; PFCs were not detected above the PQL in method blank MB 320-118100/1-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:

N/A; PFCs were not detected.

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:

N/A; 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:

Yes; 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:

Yes; LCS/LCSD RPDs were within the laboratory RPD limit of 30%.

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

Comments:

N/A; 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:

N/A; no data flags are required.

- 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 percent recoveries are within the method recommended 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:

N/A; the data did not require flags.

- 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:

No trip blank is required; see above.

- iii. All results less than PQL?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

No trip blank is required; see above.

iv. If above PQL, what samples are affected?

Comments:

No trip blank is required; see above.

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 "87249" / "87149" was submitted for 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 RPD values for each of the six analytes meet QC criteria.

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.

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, so an equipment blank was not required.

i. All results less than PQL?

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

N/A; an equipment blank was not required.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not required.

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: 320-20090-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Julie Keener



Authorized for release by:

7/29/2016 9:29:30 AM

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: 320-20090-1

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
7 roectjSite: Cit/ oRgairbanFs gire TraininGArea

TestAmerica Job ID: 320-20010-9

Job ID: 320-20090-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-20090-1

Receipt

The sam5les pere receivev on dj6j209M1:20 A; , the sam5les arrivev in Gbov convitiony5ro5erl/ 5reserwev anvyp here requirevyon ice. The tem5erature oRthe cooler at recei5t p as 93.3f C.

Receipt Exceptions

The Rollop inGsam5les pas receivev at the laborator/ outside the requirev tem5erature criteria: 9Mdd4° (320-20010-9)y413° M0-3 (320-20010-2)y6d391 (320-20010-3)y; W-40d (320-20010-°)y; W-M0d (320-20010-4)yMM19dd (320-20010-M)yMM10dd (320-20010-d) anv 6d° 06 (320-20010-6) Sam5les pere receivev pith thapev Gel 5acFs restinGon to5 oRsam5les at 93.3 veGrees Celcius. Client pas contactev anv lab pill 5roceev pith testinG

LCMS

; ethov(s) 7gAS: The Rollop inGsam5les pere anal/ zev b/ the virect inRection methov Rollop inGTestAmerica Sacramento's Stanvarv O5eratinG7rocevure (SO7)yWS-LC-0024 " ew 9.1 "7erRurinatev Com5ounvs (7 gCs) in WaterySoilsySeviments anv Tissue8 9Mdd4° (320-20010-9)y413° M0-3 (320-20010-2)y6d391 (320-20010-3)y; W-40d (320-20010-°)y; W-M0d (320-20010-4)yMM19dd (320-20010-M)yMM10dd (320-20010-d)y6d° 06 (320-20010-6)y(LCS 320-996d° 3j2-A)y(LCSD 320-996d° 3j3-A) anv (; B 320-996d° 3j9-A)

No avvitional anal/ tical or qualit/ issues pere notevyother than those vescribev above or in the DeRnitionsjx lossar/ 5aGæ.

Organic Prep

; ethov(s) 7gAS 7re5: Insufficient sam5le volume pas available to 5erRorm a matrik s5iFejmatrik s5iFe vu5licatejsam5le vu5licate (; Sj; SDjDU7) associatev pith anal/ tical batch 320-996d° 3.

No avvitional anal/ tical or qualit/ issues pere notevyother than those vescribev above or in the DeRnitionsjx lossar/ 5aGæ.

Detection Summary

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

TestAmerica Job ID: 320-20090-1

Client Sample ID: 872249

Lab Sample ID: 30-10--R-18

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac D	AetdoP	Trep 6ype
Perfluorooctanoic acid (PFOA)	8.2	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	45	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: 4R397-13

Lab Sample ID: 30-10--R-10

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac D	AetdoP	Trep 6ype
Perfluorobutanesulfonic acid (PFBS)	2.4	2.0	0.92 ng/L	1	PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.5	2.0	0.87 ng/L	1	PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4 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)	9.9	2.0	1.3 ng/L	1	PFAS	Total/NA
Perfluorononanoic acid (PFNA)	1.8 J	2.0	0.65 ng/L	1	PFAS	Total/NA

Client Sample ID: 5238R

Lab Sample ID: 30-10--R-13

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac D	AetdoP	Trep 6ype
Perfluorooctanoic acid (PFOA)	3.8	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	22	2.0	1.3 ng/L	1	PFAS	Total/NA

Client Sample ID: AW14-2

Lab Sample ID: 30-10--R-19

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac D	AetdoP	Trep 6ype
Perfluorobutanesulfonic acid (PFBS)	1.8 J	2.0	0.92 ng/L	1	PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	58	2.0	0.87 ng/L	1	PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	14	2.0	0.80 ng/L	1	PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	22	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	200	2.0	1.3 ng/L	1	PFAS	Total/NA
Perfluorononanoic acid (PFNA)	44	2.0	0.65 ng/L	1	PFAS	Total/NA

Client Sample ID: AW17-2

Lab Sample ID: 30-10--R-14

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac D	AetdoP	Trep 6ype
Perfluorobutanesulfonic acid (PFBS)	1.7 J	2.0	0.92 ng/L	1	PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	58	2.0	0.87 ng/L	1	PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	15	2.0	0.80 ng/L	1	PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	23	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	200	2.0	1.3 ng/L	1	PFAS	Total/NA
Perfluorononanoic acid (PFNA)	44	2.0	0.65 ng/L	1	PFAS	Total/NA

Client Sample ID: 77R822

Lab Sample ID: 30-10--R-17

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac D	AetdoP	Trep 6ype
Perfluorooctanoic acid (PFOA)	3.4	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: 77R-22

Lab Sample ID: 30-10--R-12

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac D	AetdoP	Trep 6ype
Perfluorooctanoic acid (PFOA)	3.5	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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-20090-1

Client Sample ID: 529- 5

Lab Sample ID: 30- 10- - R- 15

anlyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac	D AetdoP	Trep 6ype
Perfluorooctanoic acid (PFOA)	5.3	2.0	0.75 ng/L	1	PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	31	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: 320-20090-1

Client Sample ID: 97884M

Date Collected: 08/04/97 9MMD

Date Received: 08/0h/97 01:20

Lab Sample ID: 320-20010-9

r atxW o atex

r etPc6: Faf S - FexMucxinate6 f ly(I Substandes

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(Ue6	Dil Aad
FexMucxctdancid adi6 FA) f .	h2		2.0	0.75	ng/L		07/20/16 16:49	07/22/16 03:17	1
FexMucxctdancid adi6 FA) S.	M		2.0	1.3	ng/L		07/20/16 16:49	07/22/16 03:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHx	1S3		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1
18O2 PFH:	188		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1

Client Sample ID: 413M70-3

Date Collected: 08/04/97 94:04

Date Received: 08/0h/97 01:20

Lab Sample ID: 320-20010-2

r atxW o atex

r etPc6: Faf S - FexMucxinate6 f ly(I Substandes

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(Ue6	Dil Aad
FexMucxbutanesulcnid adi6 FAOS.	2M		2.0	0.92	ng/L		07/20/16 16:49	07/22/16 03:37	1
FexMucxPeVanesulcnid adi6 FA5 V6.	h2		2.0	0.87	ng/L		07/20/16 16:49	07/22/16 03:37	1
FexMucxPeptancid adi6 FA5 pf .	9M J		2.0	0.80	ng/L		07/20/16 16:49	07/22/16 03:37	1
FexMucxctdancid adi6 FA) f .	2z		2.0	0.75	ng/L		07/20/16 16:49	07/22/16 03:37	1
FexMucxctdancid adi6 FA) S.	1z		2.0	1.3	ng/L		07/20/16 16:49	07/22/16 03:37	1
FexMucxcncnancid adi6 FANf .	9h J		2.0	0.65	ng/L		07/20/16 16:49	07/22/16 03:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1CHSPFP A	1S1		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1
18O2PFP 9x	118		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1
18O2 PFHx	112		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1
18O2 PFH:	1S1		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1
18O3 PFNx	1S1		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1

Client Sample ID: h8391

Date Collected: 08/04/97 94:23

Date Received: 08/0h/97 01:20

Lab Sample ID: 320-20010-3

r atxW o atex

r etPc6: Faf S - FexMucxinate6 f ly(I Substandes

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(Ue6	Dil Aad
FexMucxctdancid adi6 FA) f .	3h		2.0	0.75	ng/L		07/20/16 16:49	07/22/16 03:57	1
FexMucxctdancid adi6 FA) S.	22		2.0	1.3	ng/L		07/20/16 16:49	07/22/16 03:57	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHx	1S3		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1
18O2 PFH:	1S/		S3 0135				5- TS71/ 1/ 24	5- TS71/ 586-	1

Client Sample ID: r o -408

Date Collected: 08/04/97 94:3M

Date Received: 08/0h/97 01:20

Lab Sample ID: 320-20010-M

r atxW o atex

r etPc6: Faf S - FexMucxinate6 f ly(I Substandes

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(Ue6	Dil Aad
FexMucxbutanesulcnid adi6 FAOS.	9h J		2.0	0.92	ng/L		07/20/16 16:49	07/23/16 12:29	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20090-1

Client Sample ID: r o -408

Date Ccllected: 08/04/97 94:3M

Date Redeive: 08/0h/97 01:20

Lab Sample ID: 320-20010-M

r atxW o atex

r etPc6: Faf S - FexMucxinate6 f ly(I Substandes Bccontinue6.

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(U6	Dil Aad
FexMucxPeWanesulknid adi6	4h		2.0	0.87	ng/L		07/20/16 16:49	07/23/16 12:29	1
FA5 V6.									
FexMucxPeptancid adi6 FA5 pf .	9M		2.0	0.80	ng/L		07/20/16 16:49	07/23/16 12:29	1
FexMucxcdtancid adi6 FA) f .	22		2.0	0.75	ng/L		07/20/16 16:49	07/23/16 12:29	1
FexMucxcdtanesulknid adi6	200		2.0	1.3	ng/L		07/20/16 16:49	07/23/16 12:29	1
FA) S.									
FexMucxcncnancid adi6 FANf .	MM		2.0	0.65	ng/L		07/20/16 16:49	07/23/16 12:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1CHSPFP A	113		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1
18O20PFP 9x	42		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1
18O2 PFHx	15S		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1
18O2 PFH:	11/		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1
18O3 PFNx	151		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1

Client Sample ID: r o -708

Date Ccllected: 08/04/97 94:2M

Date Redeive: 08/0h/97 01:20

Lab Sample ID: 320-20010-4

r atxW o atex

r etPc6: Faf S - FexMucxinate6 f ly(I Substandes

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(U6	Dil Aad
FexMucxbutanesulknid adi6	92 J		2.0	0.92	ng/L		07/20/16 16:49	07/23/16 12:49	1
FAOS.									
FexMucxPeWanesulknid adi6	4h		2.0	0.87	ng/L		07/20/16 16:49	07/23/16 12:49	1
FA5 V6.									
FexMucxPeptancid adi6 FA5 pf .	94		2.0	0.80	ng/L		07/20/16 16:49	07/23/16 12:49	1
FexMucxcdtancid adi6 FA) f .	23		2.0	0.75	ng/L		07/20/16 16:49	07/23/16 12:49	1
FexMucxcdtanesulknid adi6	200		2.0	1.3	ng/L		07/20/16 16:49	07/23/16 12:49	1
FA) S.									
FexMucxcncnancid adi6 FANf .	MM		2.0	0.65	ng/L		07/20/16 16:49	07/23/16 12:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1CHSPFP A	11-		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1
18O20PFP 9x	48		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1
18O2 PFHx	44		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1
18O2 PFH:	11-		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1
18O3 PFNx	155		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1S64	1

Client Sample ID: 771988

Date Ccllected: 08/04/97 97:90

Date Redeive: 08/0h/97 01:20

Lab Sample ID: 320-20010-7

r atxW o atex

r etPc6: Faf S - FexMucxinate6 f ly(I Substandes

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(U6	Dil Aad
FexMucxcdtancid adi6 FA) f .	32M		2.0	0.75	ng/L		07/20/16 16:49	07/23/16 13:09	1
FexMucxcdtanesulknid adi6	21		2.0	1.3	ng/L		07/20/16 16:49	07/23/16 13:09	1
FA) S.									
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHx	15-		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1864	1
18O2 PFH:	1S8		S3 0135				5- 7571/ 1/ 24	5- 75871/ 1864	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20090-1

Client Sample ID: 771088

Date Collected: 08/04/97 97:20

Date Received: 08/04/97 01:20

Lab Sample ID: 320-20010-8

Reference: atxW o atex

Reference: FAF S - Fentanyl Substances

Reference	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil	Fac
Fentanyl (FAF) f .	34		2.0	0.75	ng/L		07/20/16 16:49	07/23/16 13:29	1	
Fentanyl (FAF) S.	32		2.0	1.3	ng/L		07/20/16 16:49	07/23/16 13:29	1	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil	Fac
18O2 PFHx	4C		S3 0135				5- 7571/ 1/ 24	5- 7571/ 1864	1	
18O2 PFH:	15C		S3 0135				5- 7571/ 1/ 24	5- 7571/ 1864	1	

Client Sample ID: h8M0h

Date Collected: 08/04/97 97:4M

Date Received: 08/04/97 01:20

Lab Sample ID: 320-20010-h

Reference: atxW o atex

Reference: FAF S - Fentanyl Substances

Reference	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil	Fac
Fentanyl (FAF) f .	43		2.0	0.75	ng/L		07/20/16 16:49	07/23/16 13:49	1	
Fentanyl (FAF) S.	39		2.0	1.3	ng/L		07/20/16 16:49	07/23/16 13:49	1	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil	Fac
18O2 PFHx	153		S3 0135				5- 7571/ 1/ 24	5- 7571/ 1864	1	
18O2 PFH:	114		S3 0135				5- 7571/ 1/ 24	5- 7571/ 1864	1	

Isotope Dilution Summary

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

TestAmerica Job ID: 320-20090-1

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)
320-20090-1	167754	125	133			
320-20090-2	593460-3	114	121	121	113	121
320-20090-3	87319	125	126			
320-20090-4	MW-507	102	116	115	94	101
320-20090-5	MW-607	99	117	117	93	100
320-20090-6	669177	107	123			
320-20090-7	669077	98	108			
320-20090-8	87408	105	119			
LCS 320-118743/2-A	Lab Control Sample	120	132	125	127	127
LCSD 320-118743/3-A	Lab Control Sample Dup	101	102	103	102	106
MB 320-118743/1-A	Method Blank	130	136	130	126	133

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: 320-20090-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-118743/1-A

Matrix: Water

Analysis Batch: 118880

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 118743

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/20/16 16:49	07/22/16 02:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/20/16 16:49	07/22/16 02:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/20/16 16:49	07/22/16 02:17	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		07/20/16 16:49	07/22/16 02:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		07/20/16 16:49	07/22/16 02:17	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/20/16 16:49	07/22/16 02:17	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	130		25 - 150	07/20/16 16:4 C	07/22/16 02:47	1
13p: -PFHA9	126		25 - 150	07/20/16 16:4 C	07/22/16 02:47	1
13p: PFO9	130		25 - 150	07/20/16 16:4 C	07/22/16 02:47	1
13p: PFOS	136		25 - 150	07/20/16 16:4 C	07/22/16 02:47	1
13p 5 PFN9	133		25 - 150	07/20/16 16:4 C	07/22/16 02:47	1

Lab Sample ID: LCS 320-118743/2-A

Matrix: Water

Analysis Batch: 118880

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 118743

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	17.6		ng/L		99	55 - 147
Perfluorohexanesulfonic acid (PFHxS)	18.2	19.3		ng/L		106	58 - 138
Perfluoroheptanoic acid (PFHpA)	20.0	19.3		ng/L		97	63 - 135
Perfluorooctanoic acid (PFOA)	20.0	21.1		ng/L		106	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	18.7		ng/L		101	47 - 162
Perfluorononanoic acid (PFNA)	20.0	21.2		ng/L		106	71 - 140

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	125		25 - 150
13p: -PFHA9	127		25 - 150
13p: PFO9	120		25 - 150
13p: PFOS	132		25 - 150
13p 5 PFN9	127		25 - 150

Lab Sample ID: LCSD 320-118743/3-A

Matrix: Water

Analysis Batch: 118880

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 118743

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	19.4		ng/L		110	55 - 147	10	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	20.7		ng/L		114	58 - 138	7	30
Perfluoroheptanoic acid (PFHpA)	20.0	21.4		ng/L		107	63 - 135	10	30
Perfluorooctanoic acid (PFOA)	20.0	21.7		ng/L		108	63 - 141	3	30
Perfluorooctanesulfonic acid (PFOS)	18.6	20.2		ng/L		109	47 - 162	8	30
Perfluorononanoic acid (PFNA)	20.0	21.7		ng/L		108	71 - 140	2	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson

Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-20090-1

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
<i>18O2 PFHxS</i>	103		25 - 150
<i>13p: -PFHA9</i>	102		25 - 150
<i>13p: PFO9</i>	101		25 - 150
<i>13p: PFOS</i>	102		25 - 150
<i>13p 5 PFN9</i>	106		25 - 150

QC Association Summary

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

TestAmerica Job ID: 320-20090-1

LCMS

Prep Batch: 118743

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20090-1	167754	Total/NA	Water	PFAS Prep	
320-20090-2	593460-3	Total/NA	Water	PFAS Prep	
320-20090-3	87319	Total/NA	Water	PFAS Prep	
320-20090-4	MW-507	Total/NA	Water	PFAS Prep	
320-20090-5	MW-607	Total/NA	Water	PFAS Prep	
320-20090-6	669177	Total/NA	Water	PFAS Prep	
320-20090-7	669077	Total/NA	Water	PFAS Prep	
320-20090-8	87408	Total/NA	Water	PFAS Prep	
MB 320-118743/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-118743/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-118743/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 118880

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20090-1	167754	Total/NA	Water	PFAS	118743
320-20090-2	593460-3	Total/NA	Water	PFAS	118743
320-20090-3	87319	Total/NA	Water	PFAS	118743
MB 320-118743/1-A	Method Blank	Total/NA	Water	PFAS	118743
LCS 320-118743/2-A	Lab Control Sample	Total/NA	Water	PFAS	118743
LCSD 320-118743/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	118743

Analysis Batch: 119234

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20090-4	MW-507	Total/NA	Water	PFAS	118743
320-20090-5	MW-607	Total/NA	Water	PFAS	118743
320-20090-6	669177	Total/NA	Water	PFAS	118743
320-20090-7	669077	Total/NA	Water	PFAS	118743
320-20090-8	87408	Total/NA	Water	PFAS	118743

Lab Chronicle

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

TestAmerica Job ID: 320-20090-1

Client Sample ID: 872249

Date Collecte6: - 2/- 4/87 89:9-

Date Receive6: - 2/- T/87 - M0-

Lab Sample ID: 30- 10- - M- 18

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	118743	07/20/16 16:49	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118880	07/22/16 03:17	SER	TAL SAC

Client Sample ID: 4M97- 13

Date Collecte6: - 2/- 4/87 84:- 4

Date Receive6: - 2/- T/87 - M0-

Lab Sample ID: 30- 10- - M- 10

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	118743	07/20/16 16:49	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118880	07/22/16 03:37	SER	TAL SAC

Client Sample ID: T238M

Date Collecte6: - 2/- 4/87 84:03

Date Receive6: - 2/- T/87 - M0-

Lab Sample ID: 30- 10- - M- 13

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	118743	07/20/16 16:49	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			118880	07/22/16 03:57	SER	TAL SAC

Client Sample ID: x d 14- 2

Date Collecte6: - 2/- 4/87 84:39

Date Receive6: - 2/- T/87 - M0-

Lab Sample ID: 30- 10- - M- 19

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	118743	07/20/16 16:49	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119234	07/23/16 12:29	SER	TAL SAC

Client Sample ID: x d 17- 2

Date Collecte6: - 2/- 4/87 84:09

Date Receive6: - 2/- T/87 - M0-

Lab Sample ID: 30- 10- - M- 14

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	118743	07/20/16 16:49	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119234	07/23/16 12:49	SER	TAL SAC

Client Sample ID: 77M822

Date Collecte6: - 2/- 4/87 87:8-

Date Receive6: - 2/- T/87 - M0-

Lab Sample ID: 30- 10- - M- 17

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	118743	07/20/16 16:49	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119234	07/23/16 13:09	SER	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-20090-1

Client Sample ID: 77M-22

Date Collected: - 2/- 4/87 87:0-

Date Received: - 2/- T/87 - M0-

Lab Sample ID: 30-10--M-12

x atriW d ater

Are y Bpe	Patch y Bpe	Patch x etho6	Rzn	Dil Nactor	Initial smoz nt	Ninal smoz nt	Patch 5 z mber	Arepare6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	118743	07/20/16 16:49	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119234	07/23/16 13:29	SER	TAL SAC

Client Sample ID: T29-T

Date Collected: - 2/- 4/87 87:49

Date Received: - 2/- T/87 - M0-

Lab Sample ID: 30-10--M-1T

x atriW d ater

Are y Bpe	Patch y Bpe	Patch x etho6	Rzn	Dil Nactor	Initial smoz nt	Ninal smoz nt	Patch 5 z mber	Arepare6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	118743	07/20/16 16:49	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119234	07/23/16 13:49	SER	TAL SAC

LaboratorB Referenceu:

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: 320-20090-1

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	12-18-16
Arizona	State Program	9	AZ0708	08-11-16 *
Arkansas DEQ	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-16
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	07-31-16 *
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	10-31-16
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-16
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: 320-20090-1

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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-20090-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-20090-1	167754	Water	07/05/16 14:40	07/08/16 09:20
320-20090-2	593460-3	Water	07/05/16 15:05	07/08/16 09:20
320-20090-3	87319	Water	07/05/16 15:23	07/08/16 09:20
320-20090-4	MW-507	Water	07/05/16 15:34	07/08/16 09:20
320-20090-5	MW-607	Water	07/05/16 15:24	07/08/16 09:20
320-20090-6	669177	Water	07/05/16 16:10	07/08/16 09:20
320-20090-7	669077	Water	07/05/16 16:20	07/08/16 09:20
320-20090-8	87408	Water	07/05/16 16:54	07/08/16 09:20

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

1200 17th Street, Suite 1024
Denver, Co 80202
(303) 825-3800

303 Wellsian Way
Richland, WA 99352
(509) 946-6309

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory TEST AMERICA
Attn: DAVID ALTHEIMER

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Pres	Total Number of Containers	Remarks/Matrix
167754		1440	7/5/16	✓	✓	✓	2	GROUNDWATER
593460-3		1505		✓	✓		2	
87319		1523		✓	✓		2	
MW-507		1534		✓	✓		2	
MW-607		1524		✓	✓		2	
669177		1610		✓	✓		2	
669077		1620		✓	✓		2	
87408		1654		✓	✓		2	



320-20090 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>SH-11735-005</u>	Total Number of Containers: <u>6</u>	Signature: <u>Julie Keener</u>	Time: <u>11:20</u>	Signature: _____	Time: _____	Signature: _____	Time: _____	Signature: _____	Time: _____
Project Name: <u>GC-FIRETRAIN</u>	GC Seals/Intact? Y/N/NA: <u>Y</u>	Printed Name: <u>JULIE KEENER</u>	Date: <u>7/5/16</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Contact: <u>MDN/JAL</u>	Received Good Cond./Cold: <u>Y</u>	Company: <u>SHANNON & WILSON</u>		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: <u>FEDEX</u>								
Sampler: <u>MDN/PKG/TXG</u>	(attach shipping bill, if any)								
Instructions									
Requested Turnaround Time: <u>STANDARD</u>									
Special Instructions: <u>PLEASE NOTIFY UPON ARRIVAL OF SHIPMENT</u>									
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 M. Edman</u>	Time: <u>0920</u>	Signature: _____	Time: _____	Signature: _____	Time: _____				
Printed Name: <u>Connor M. Edman</u>	Date: <u>7/5/16</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____				
Company: <u>TAW</u>		Company: _____		Company: _____					

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-20090-1

Login Number: 20090

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.	False	Cooler temperature outside required temperature criteria.
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:

- 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:

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:

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

☒Yes ☐No ☐NA (Please explain.)

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."

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

Other than the above-range temperature, 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.

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

Comments:

No, data quality and usability were not considered 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 notes there was not enough sample volume to analyze MS/MSD samples.

- c. Were all corrective actions documented?

☐Yes ☐No ☒NA (Please explain.)

Comments:

N/A; no corrective actions were required.

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

Comments:

The data quality and usability were not affected.

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:

N/A; no soil samples were 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 level 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:

N/A; PFCs were not detected above the PQL in method blank MB 118743/1-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:

N/A; PFCs were not detected.

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:

N/A; 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:

Yes; 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:

Yes; LCS/LCSD RPDs were within the ADEC DQO limit of 30%. The maximum RPD for this WO was 10%.

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

Comments:

N/A; 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:

N/A; no data flags are required.

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 percent recoveries are within the method recommended 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:

N/A; the data did not require flags.

- 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:

No trip blank is required; see above.

- iii. All results less than PQL?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

No trip blank is required; see above.

iv. If above PQL, what samples are affected?

Comments:

No trip blank is required; see above.

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:

Two field duplicate pairs were submitted with this WO.

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The field duplicate pair "MW-507" / "MW-607" was submitted for determination of six PFC analytes. The field duplicate pair "669177" / "669077" was submitted for determination of PFOS and PFOA only.

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 RPD values for each of the PFC analytes meet QC criteria. The maximum RPD for each field duplicate pair was 9.8%.

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.

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

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

Reusable pumps were used during sample collection for two of the samples in this WO. An equipment blank sample was not submitted with this WO, but equipment blanks are submitted with the appropriate frequency for the overall project.

i. All results less than PQL?

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

N/A; an equipment blank was not submitted with this WO.

ii. If above PQL, what samples are affected?

Comments:

N/A; no results were above the PQL.

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: 320-20105-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Julie Keener



Authorized for release by:

7/29/2016 9:43:16 AM

David Alltucker, Project Manager I

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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: 320-20901-9

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: 320-20105-1

Job ID: 320-20105-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-20105-1

Receipt

The samples were received on 7/8/2016 3:49 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 9.6° C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: 87301 (320-20105-1), 92959 (320-20105-2), 87335 (320-20105-3), 671281 (320-20105-4), 536555-3 (320-20105-5), 92924 (320-20105-6), 87416 (320-20105-7), 87516 (320-20105-8), 92711 (320-20105-9), 127124 (320-20105-10), MW-710 (320-20105-11), MW-508A (320-20105-12), MW-705A (320-20105-13), MW-705B (320-20105-14), MW-304B (320-20105-15), MW-304A (320-20105-16) and EB-304A (320-20105-17). The temperature of the temperature blank in the cooler was at 9.6° C. A sample bottle was also measure, and was measured at 5.4° C.

LCMS

Method(s) PFAS: The following 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": 87301 (320-20105-1), 92959 (320-20105-2), 87335 (320-20105-3), 671281 (320-20105-4), 536555-3 (320-20105-5), 92924 (320-20105-6), 87416 (320-20105-7), 87516 (320-20105-8), 92711 (320-20105-9), 127124 (320-20105-10), MW-710 (320-20105-11), MW-508A (320-20105-12), MW-705A (320-20105-13), MW-705B (320-20105-14), MW-304B (320-20105-15), MW-304A (320-20105-16) and EB-304A (320-20105-17).

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/sample duplicate (MS/MSD/DUP) associated with analytical batch 320-118744.

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: 320-20901-9

Client Sample ID: 87301

Lab Sample ID: 320-20105-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.1		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	2N		2.0	9.3	ng/L			9	PFAS	Total/5 A

Client Sample ID: 92959

Lab Sample ID: 320-20105-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.8		2.0	0.42	ng/L			9	PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	22		2.0	0.87	ng/L			9	PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L			9	PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	3.4		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	2B		2.0	9.3	ng/L			9	PFAS	Total/5 A

Client Sample ID: 87335

Lab Sample ID: 320-20105-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	4.2		2.0	9.3	ng/L			9	PFAS	Total/5 A

Client Sample ID: 671281

Lab Sample ID: 320-20105-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.2	J	2.0	0.42	ng/L			9	PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	4.3		2.0	0.87	ng/L			9	PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	3.2		2.0	0.80	ng/L			9	PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	1.3		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	97		2.0	9.3	ng/L			9	PFAS	Total/5 A
Perfluorononanoic acid (PFNA)	9.2	J	2.0	0.61	ng/L			9	PFAS	Total/5 A

Client Sample ID: 536555-3

Lab Sample ID: 320-20105-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.2	J	2.0	0.42	ng/L			9	PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	6.4		2.0	0.87	ng/L			9	PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	9.2	J	2.0	0.80	ng/L			9	PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	22		2.0	9.3	ng/L			9	PFAS	Total/5 A

Client Sample ID: 92924

Lab Sample ID: 320-20105-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.3		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	3N		2.0	9.3	ng/L			9	PFAS	Total/5 A

Client Sample ID: 87416

Lab Sample ID: 320-20105-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.N		2.0	0.42	ng/L			9	PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	26		2.0	0.87	ng/L			9	PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	3.2		2.0	0.80	ng/L			9	PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	N0		2.0	0.71	ng/L			9	PFAS	Total/5 A

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: 87416 (Continued)

Lab Sample ID: 320-20105-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	20		2.0	9.3	ng/L	9		PFAS	Total/5 A

Client Sample ID: 87516

Lab Sample ID: 320-20105-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PF8S)	3.N		2.0	0.42	ng/L	9		PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	26		2.0	0.87	ng/L	9		PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	3.2		2.0	0.80	ng/L	9		PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	N3		2.0	0.71	ng/L	9		PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	29		2.0	9.3	ng/L	9		PFAS	Total/5 A

Client Sample ID: 92711

Lab Sample ID: 320-20105-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	9.7	J	2.0	0.87	ng/L	9		PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	9.9	J	2.0	0.80	ng/L	9		PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	9.N	J	2.0	0.71	ng/L	9		PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	9.N	J	2.0	9.3	ng/L	9		PFAS	Total/5 A

Client Sample ID: 127124

Lab Sample ID: 320-20105-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	9N		2.0	0.71	ng/L	9		PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	33		2.0	9.3	ng/L	9		PFAS	Total/5 A

Client Sample ID: MW-710

Lab Sample ID: 320-20105-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PF8S)	2.1		2.0	0.42	ng/L	9		PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	2N		2.0	0.87	ng/L	9		PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	NB		2.0	0.80	ng/L	9		PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	1.2		2.0	0.71	ng/L	9		PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	2N		2.0	9.3	ng/L	9		PFAS	Total/5 A
Perfluorononanoic acid (PF5A)	9.4	J	2.0	0.61	ng/L	9		PFAS	Total/5 A

Client Sample ID: MW-508A

Lab Sample ID: 320-20105-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PF8S)	2.1		2.0	0.42	ng/L	9		PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	23		2.0	0.87	ng/L	9		PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	1.9		2.0	0.80	ng/L	9		PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	N7		2.0	0.71	ng/L	9		PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	2B		2.0	9.3	ng/L	9		PFAS	Total/5 A
Perfluorononanoic acid (PF5A)	9.1	J	2.0	0.61	ng/L	9		PFAS	Total/5 A

Client Sample ID: MW-705A

Lab Sample ID: 320-20105-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PF8S)	6.3		2.0	0.42	ng/L	9		PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	34		2.0	0.87	ng/L	9		PFAS	Total/5 A

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: MW-705A (Continued)

Lab Sample ID: 320-20105-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	1.1		2.0	0.80	ng/L			9	PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	7.3		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	32		2.0	9.3	ng/L			9	PFAS	Total/5 A

Client Sample ID: MW-705B

Lab Sample ID: 320-20105-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.2		2.0	0.42	ng/L			9	PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L			9	PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	N9		2.0	0.80	ng/L			9	PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	6.N		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	22		2.0	9.3	ng/L			9	PFAS	Total/5 A

Client Sample ID: MW-304B

Lab Sample ID: 320-20105-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.3		2.0	0.42	ng/L			9	PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L			9	PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	4.3		2.0	0.80	ng/L			9	PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	90		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	4.2		2.0	9.3	ng/L			9	PFAS	Total/5 A
Perfluorononanoic acid (PFNA)	2.6		2.0	0.61	ng/L			9	PFAS	Total/5 A

Client Sample ID: MW-304A

Lab Sample ID: 320-20105-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	90		2.0	0.42	ng/L			9	PFAS	Total/5 A
Perfluorohexanesulfonic acid (PFHxS)	B1		2.0	0.87	ng/L			9	PFAS	Total/5 A
Perfluoroheptanoic acid (PFHpA)	91		2.0	0.80	ng/L			9	PFAS	Total/5 A
Perfluorooctanoic acid (PFOA)	9N		2.0	0.71	ng/L			9	PFAS	Total/5 A
Perfluorooctanesulfonic acid (PFOS)	1B		2.0	9.3	ng/L			9	PFAS	Total/5 A
Perfluorononanoic acid (PFNA)	B.7		2.0	0.61	ng/L			9	PFAS	Total/5 A

Client Sample ID: EB-304A

Lab Sample ID: 320-20105-17

50 Detections.

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: 320-20901-9

Client Sample ID: 87301

Date Collected: 07/06/16 09:48

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.5		2.0	0.01	ng/		0d/20/9B 9B:1B	0d/23/9B 91:0)	9
Perfluorooctanesulfonic acid (PFOS)	24		2.0	9.8	ng/		0d/20/9B 9B:1B	0d/23/9B 91:0)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHx	11S		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1064	1
18O2 PFH:	130		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1064	1

Client Sample ID: 92959

Date Collected: 07/06/16 10:28

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-2

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.8		2.0	0.02	ng/		0d/20/9B 9B:1B	0d/23/9B 91:..)	9
Perfluorohexanesulfonic acid (PFHxS)	22		2.0	0.0 d	ng/		0d/20/9B 9B:1B	0d/23/9B 91:..)	9
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.0 0	ng/		0d/20/9B 9B:1B	0d/23/9B 91:..)	9
Perfluorooctanoic acid (PFOA)	3.9		2.0	0.01	ng/		0d/20/9B 9B:1B	0d/23/9B 91:..)	9
Perfluorooctanesulfonic acid (PFOS)	28		2.0	9.8	ng/		0d/20/9B 9B:1B	0d/23/9B 91:..)	9
Perfluorononanoic acid (PFNA)	4 D		2.0	0.01	ng/		0d/20/9B 9B:1B	0d/23/9B 91:..)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	114		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1064	1
18O2 PFCAx	1SS		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1064	1
18O2 PFHx	111		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1064	1
18O2 PFH:	13/		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1064	1
18O0 PF9x	112		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1064	1

Client Sample ID: 87335

Date Collected: 07/06/16 11:30

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-3

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	0.01	ng/		0d/20/9B 9B:1B	0d/23/9B 9B:0)	9
Perfluorooctanesulfonic acid (PFOS)	9.2		2.0	9.8	ng/		0d/20/9B 9B:1B	0d/23/9B 9B:0)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHx	1S8		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O2 PFH:	114		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1

Client Sample ID: 671281

Date Collected: 07/06/16 12:27

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-4

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.2 J		2.0	0.02	ng/		0d/20/9B 9B:1B	0d/23/9B 9B:2)	9

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: 671281

Date Collected: 07/06/16 12:27

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-4

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	9.3		2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:2)	9
Perfluoroheptanoic acid (PFHpA)	3.2		2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:2)	9
Perfluorooctanoic acid (PFOA)	5.3		2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:2)	9
Perfluorooctanesulfonic acid (PFOS)	17		2.0	9.8	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:2)	9
Perfluorononanoic acid (PFNA)	1.2	J	2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:2)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	131		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O2 PFCAx	150		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O2 PFHx	15		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O2 PFH:	138		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O0 PF9x	113		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1

Client Sample ID: 536555-3

Date Collected: 07/06/16 11:00

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-5

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.2	J	2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:)	9
Perfluorohexanesulfonic acid (PFHxS)	6.9		2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:)	9
Perfluoroheptanoic acid (PFHpA)	1.2	J	2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:)	9
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:)	9
Perfluorooctanesulfonic acid (PFOS)	22		2.0	9.8	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:)	9
Perfluorononanoic acid (PFNA)	4	D	2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	11		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O2 PFCAx	155		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O2 PFHx	15		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O2 PFH:	133		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1
18O0 PF9x	112		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1/ 64	1

Client Sample ID: 92924

Date Collected: 07/06/16 12:40

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-6

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	5.3		2.0	0.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:0)	9
Perfluorooctanesulfonic acid (PFOS)	34		2.0	9.8	ng/l		0d/20/9B 9B:1B	0d/23/9B 9B:0)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHx	113		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1- 64	1
18O2 PFH:	130		30 510S				S- 3871/ 1/ 60/	S- 3871/ 1- 64	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: 87416

Date Collected: 07/06/16 14:45

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-7

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	0.02	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:2)	9
Perfluorohexanesulfonic acid (PFHxS)	26		2.0	0.04	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:2)	9
Perfluoroheptanoic acid (PFHpA)	3.2		2.0	0.00	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:2)	9
Perfluorooctanoic acid (PFOA)	4.0		2.0	0.01	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:2)	9
Perfluorooctanesulfonic acid (PFOS)	20		2.0	9.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:2)	9
PerflLorononanoic aci7 6PF4 A8	4 D		2.0	0.01	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:2)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	13-		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1
18O2PFCAx	11S		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1
18O2 PFHx	110		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1
18O2 PFH:	18S		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1
18O0 PF9x	11N		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1

Client Sample ID: 87516

Date Collected: 07/06/16 14:35

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-8

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	0.02	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:.)	9
Perfluorohexanesulfonic acid (PFHxS)	26		2.0	0.04	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:.)	9
Perfluoroheptanoic acid (PFHpA)	3.2		2.0	0.00	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:.)	9
Perfluorooctanoic acid (PFOA)	4.3		2.0	0.01	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:.)	9
Perfluorooctanesulfonic acid (PFOS)	21		2.0	9.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:.)	9
PerflLorononanoic aci7 6PF4 A8	4 D		2.0	0.01	ng/l		0d/20/9B 9B:1B	0d/23/9B 9d:.)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	131		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1
18O2PFCAx	1S/		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1
18O2 PFHx	118		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1
18O2 PFH:	11N		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1
18O0 PF9x	118		30 510S				S- 7371/ 1/ 60/	S- 7371/ 1- 64	1

Client Sample ID: 92711

Date Collected: 07/06/16 15:10

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-9

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PerflLorobLtanessulfonic aci7 6PFx S8	4 D		2.0	0.02	ng/l		0d/20/9B 9B:1B	0d/23/9B 9):0)	9
Perfluorohexanesulfonic acid (PFHxS)	1.7 J		2.0	0.04	ng/l		0d/20/9B 9B:1B	0d/23/9B 9):0)	9
Perfluoroheptanoic acid (PFHpA)	1.1 J		2.0	0.00	ng/l		0d/20/9B 9B:1B	0d/23/9B 9):0)	9
Perfluorooctanoic acid (PFOA)	1.4 J		2.0	0.01	ng/l		0d/20/9B 9B:1B	0d/23/9B 9):0)	9
Perfluorooctanesulfonic acid (PFOS)	1.4 J		2.0	9.0	ng/l		0d/20/9B 9B:1B	0d/23/9B 9):0)	9

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: 92711

Date Collected: 07/06/16 15:10

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-9

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PerflLorononanoic aci7 6PF4 A8	4 D		2.0	0.01	ng/()		0d/20/9B 9B:1B	0d/23/9B 9):0)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	110		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1464	1
18O2PFCAx	1S3		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1464	1
18O2 PFHx	1SN		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1464	1
18O2 PFH:	131		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1464	1
18O0 PF9 x	112		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1464	1

Client Sample ID: 127124

Date Collected: 07/06/16 15:02

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-10

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	14		2.0	0.01	ng/()		0d/20/9B 9B:1B	0d/23/9B 9):2)	9
Perfluorooctanesulfonic acid (PFOS)	33		2.0	9.0	ng/()		0d/20/9B 9B:1B	0d/23/9B 9):2)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHx	1S3		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1464	1
18O2 PFH:	13S		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1464	1

Client Sample ID: MW-710

Date Collected: 07/06/16 11:57

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-11

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.5		2.0	0.02	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:0)	9
Perfluorohexanesulfonic acid (PFHxS)	24		2.0	0.0 d	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:0)	9
Perfluoroheptanoic acid (PFHpA)	4.8		2.0	0.0 0	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:0)	9
Perfluorooctanoic acid (PFOA)	5.2		2.0	0.01	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:0)	9
Perfluorooctanesulfonic acid (PFOS)	24		2.0	9.0	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:0)	9
Perfluorononanoic acid (PFNA)	1.9 J		2.0	0.01	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:0)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	11/		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1N64	1
18O2PFCAx	1SS		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1N64	1
18O2 PFHx	1S/		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1N64	1
18O2 PFH:	132		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1N64	1
18O0 PF9 x	113		30 510S				S- 7371/ 1/ 60/	S- 73871/ 1N64	1

Client Sample ID: MW-508A

Date Collected: 07/06/16 13:43

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-12

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.5		2.0	0.02	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:2)	9

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: MW-508A

Date Collected: 07/06/16 13:43

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-12

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	23		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:2)	9
Perfluoroheptanoic acid (PFHpA)	5.1		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:2)	9
Perfluorooctanoic acid (PFOA)	4.7		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:2)	9
Perfluorooctanesulfonic acid (PFOS)	28		2.0	9.0	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:2)	9
Perfluorononanoic acid (PFNA)	1.5	J	2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/23/9B 9N:2)	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	11N		30 510S				S- 7371/ 1/ 0/	S- 7371/ 1N34	1
18O2 PFCAx	1SS		30 510S				S- 7371/ 1/ 0/	S- 7371/ 1N34	1
18O2 PFHx	11S		30 510S				S- 7371/ 1/ 0/	S- 7371/ 1N34	1
18O2 PFH:	132		30 510S				S- 7371/ 1/ 0/	S- 7371/ 1N34	1
18O0 PF9x	118		30 510S				S- 7371/ 1/ 0/	S- 7371/ 1N34	1

Client Sample ID: MW-705A

Date Collected: 07/06/16 15:20

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-13

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	6.3		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 99:1B	9
Perfluorohexanesulfonic acid (PFHxS)	39		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 99:1B	9
Perfluoroheptanoic acid (PFHpA)	5.5		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 99:1B	9
Perfluorooctanoic acid (PFOA)	7.3		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 99:1B	9
Perfluorooctanesulfonic acid (PFOS)	32		2.0	9.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 99:1B	9
Perfluorononanoic acid (PFNA)	4	D	2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 99:1B	9
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
14H3 PFCp:	118		30 510S				S- 7371/ 1/ 0/	S- 7371/ 110/	1
18O2 PFCAx	110		30 510S				S- 7371/ 1/ 0/	S- 7371/ 110/	1
18O2 PFHx	11-		30 510S				S- 7371/ 1/ 0/	S- 7371/ 110/	1
18O2 PFH:	11-		30 510S				S- 7371/ 1/ 0/	S- 7371/ 110/	1
18O0 PF9x	13S		30 510S				S- 7371/ 1/ 0/	S- 7371/ 110/	1

Client Sample ID: MW-705B

Date Collected: 07/06/16 16:28

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-14

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.2		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 92:9B	9
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 92:9B	9
Perfluoroheptanoic acid (PFHpA)	4.1		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 92:9B	9
Perfluorooctanoic acid (PFOA)	6.4		2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 92:9B	9
Perfluorooctanesulfonic acid (PFOS)	22		2.0	9.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 92:9B	9
Perfluorononanoic acid (PFNA)	4	D	2.0	0.0	ng/()		0d/20/9B 9B:1B	0d/22/9B 92:9B	9

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: MW-705B

Date Collected: 07/06/16 16:28

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-14

Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
14H3 PFCp:	11/		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/	1
18O2 PFCAx	113		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/	1
18O2 PFHx	118		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/	1
18O2 PFH:	110		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/	1
18O0 PF9x	11/		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/	1

Client Sample ID: MW-304B

Date Collected: 07/06/16 18:04

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-15

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.3		2.0	0.02	ng/		0d/20/9B 9B:1B	0d/22/9B 92:3B	9
Perfluorohexanesulfonic acid (PFHxS)	52		2.0	0.04	ng/		0d/20/9B 9B:1B	0d/22/9B 92:3B	9
Perfluoroheptanoic acid (PFHpA)	9.3		2.0	0.00	ng/		0d/20/9B 9B:1B	0d/22/9B 92:3B	9
Perfluorooctanoic acid (PFOA)	10		2.0	0.01	ng/		0d/20/9B 9B:1B	0d/22/9B 92:3B	9
Perfluorooctanesulfonic acid (PFOS)	9.2		2.0	9.0	ng/		0d/20/9B 9B:1B	0d/22/9B 92:3B	9
Perfluorononanoic acid (PFNA)	2.6		2.0	0.01	ng/		0d/20/9B 9B:1B	0d/22/9B 92:3B	9
Isotope Dilution	%Recovery	Qualifier	Limits						
14H3 PFCp:	133		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1
18O2 PFCAx	110		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1
18O2 PFHx	130		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1
18O2 PFH:	18S		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1
18O0 PF9x	134		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1

Client Sample ID: MW-304A

Date Collected: 07/06/16 19:01

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-16

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	10		2.0	0.02	ng/		0d/20/9B 9B:1B	0d/22/9B 92:1B	9
Perfluorohexanesulfonic acid (PFHxS)	85		2.0	0.04	ng/		0d/20/9B 9B:1B	0d/22/9B 92:1B	9
Perfluoroheptanoic acid (PFHpA)	15		2.0	0.00	ng/		0d/20/9B 9B:1B	0d/22/9B 92:1B	9
Perfluorooctanoic acid (PFOA)	14		2.0	0.01	ng/		0d/20/9B 9B:1B	0d/22/9B 92:1B	9
Perfluorooctanesulfonic acid (PFOS)	58		2.0	9.0	ng/		0d/20/9B 9B:1B	0d/22/9B 92:1B	9
Perfluorononanoic acid (PFNA)	8.7		2.0	0.01	ng/		0d/20/9B 9B:1B	0d/22/9B 92:1B	9
Isotope Dilution	%Recovery	Qualifier	Limits						
14H3 PFCp:	134		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1
18O2 PFCAx	11/		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1
18O2 PFHx	134		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1
18O2 PFH:	180		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1
18O0 PF9x	180		30 510S	S- 7371/ 1/ 6/	S- 7371/ 136/				1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: EB-304A

Lab Sample ID: 320-20105-17

Date Collected: 07/06/16 19:33

Matrix: Water

Date Received: 07/08/16 15:49

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PerflLorobLtanelsLfonic aci7 6PFx S8	4 D		2u0	0uN2	ng/(		0d/20/9B 9B:1B	0d/21/9B 29:9B	9
PerflLoroheLtanelsLfonic aci7 6PFp HS8	4 D		2u0	0u d	ng/(		0d/20/9B 9B:1B	0d/21/9B 29:9B	9
PerflLorohe5tanoic aci7 6PFp 5A8	4 D		2u0	0u 0	ng/(		0d/20/9B 9B:1B	0d/21/9B 29:9B	9
PerflLorooctanoic aci7 6PFOA8	4 D		2u0	0ud1	ng/(		0d/20/9B 9B:1B	0d/21/9B 29:9B	9
PerflLorooctanesLfonic aci7 6PFOS8	4 D		2u0	9u3	ng/(		0d/20/9B 9B:1B	0d/21/9B 29:9B	9
PerflLorononanoic aci7 6PF4 A8	4 D		2u0	0uB1	ng/(		0d/20/9B 9B:1B	0d/21/9B 29:9B	9

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
14H3 PFCp:	13S		30 510S	S- 73S71/ 1/ 60/	S- 73071/ 316/	1
18O2 PFCAx	113		30 510S	S- 73S71/ 1/ 60/	S- 73071/ 316/	1
18O2 PFHx	112		30 510S	S- 73S71/ 1/ 60/	S- 73071/ 316/	1
18O2 PFH:	130		30 510S	S- 73S71/ 1/ 60/	S- 73071/ 316/	1
18O0 PF9 x	11-		30 510S	S- 73S71/ 1/ 60/	S- 73071/ 316/	1

Isotope Dilution Summary

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

TestAmerica Job ID: 320-20105-1

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)
320-20105-1	87301	110	125			
320-20105-2	92959	111	126	118	100	114
320-20105-3	87335	103	118			
320-20105-4	671281	107	123	121	105	112
320-20105-5	536555-3	109	122	117	100	114
320-20105-6	92924	112	125			
320-20105-7	87416	115	130	127	110	119
320-20105-8	87516	113	119	121	106	113
320-20105-9	92711	109	121	115	102	114
320-20105-10	127124	102	120			
320-20105-11	MW-710	106	124	116	100	112
320-20105-12	MW-508A	110	124	119	100	113
320-20105-13	MW-705A	117	117	113	115	120
320-20105-14	MW-705B	113	115	116	112	116
320-20105-15	MW-304B	125	130	122	115	128
320-20105-16	MW-304A	128	135	128	116	135
320-20105-17	EB-304A	114	125	120	112	117
LCS 320-118744/2-A	Lab Control Sample	116	127	125	106	118
LCSD 320-118744/3-A	Lab Control Sample Dup	115	127	124	105	118
MB 320-118744/1-A	Method Blank	107	124	121	105	113

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: 320-20901-9

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-118744/1-A

Matrix: Water

Analysis Batch: 119234

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 118744

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.12	ng/7		06/20/94 94:14	06/23/94 98:0L	9
Perfluorohexanesulfonic acid (PFpHS)	ND		2.0	0.x6	ng/7		06/20/94 94:14	06/23/94 98:0L	9
Perfluoroheptanoic acid (PFp5A)	ND		2.0	0.x0	ng/7		06/20/94 94:14	06/23/94 98:0L	9
Perfluorooctanoic acid (PFOA)	ND		2.0	0.61	ng/7		06/20/94 94:14	06/23/94 98:0L	9
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	9.3	ng/7		06/20/94 94:14	06/23/94 98:0L	9
Perfluorononanoic acid (PFNA)	ND		2.0	0.41	ng/7		06/20/94 94:14	06/23/94 98:0L	9

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	121		23 0135	5- 725716 16:36	5- 72/ 716 14:5C	1
1/p 4 PFHA9	153		23 0135	5- 725716 16:36	5- 72/ 716 14:5C	1
1/p 4 PFO9	15-		23 0135	5- 725716 16:36	5- 72/ 716 14:5C	1
1/p 4 PFOS	124		23 0135	5- 725716 16:36	5- 72/ 716 14:5C	1
1/p 3 PFN9	11/		23 0135	5- 725716 16:36	5- 72/ 716 14:5C	1

Lab Sample ID: LCS 320-118744/2-A

Matrix: Water

Analysis Batch: 119234

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 118744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	96.6	96.9		ng/7		L6	11 - 986
Perfluorohexanesulfonic acid (PFpHS)	9x.2	9x.6		ng/7		903	1x - 93x
Perfluoroheptanoic acid (PFp5A)	20.0	9L.3		ng/7		L6	43 - 931
Perfluorooctanoic acid (PFOA)	20.0	9L.3		ng/7		L4	43 - 989
Perfluorooctanesulfonic acid (PFOS)	9x.4	9x.x		ng/7		909	86 - 942
Perfluorononanoic acid (PFNA)	20.0	9L.1		ng/7		L6	69 - 980

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	123		23 0135
1/p 4 PFHA9	156		23 0135
1/p 4 PFO9	116		23 0135
1/p 4 PFOS	12-		23 0135
1/p 3 PFN9	118		23 0135

Lab Sample ID: LCSD 320-118744/3-A

Matrix: Water

Analysis Batch: 119234

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 118744

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	96.6	96.1		ng/7		LL	11 - 986	2	30
Perfluorohexanesulfonic acid (PFpHS)	9x.2	9x.L		ng/7		908	1x - 93x	9	30
Perfluoroheptanoic acid (PFp5A)	20.0	9L.L		ng/7		LL	43 - 931	3	30
Perfluorooctanoic acid (PFOA)	20.0	20.0		ng/7		900	43 - 989	3	30
Perfluorooctanesulfonic acid (PFOS)	9x.4	9L.0		ng/7		902	86 - 942	9	30
Perfluorononanoic acid (PFNA)	20.0	20.9		ng/7		909	69 - 980	3	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson

TestAmerica Job ID: 320-20901-9

Project/Site: City of Fairbanks Fire Training Area

LCSD		LCSD	Qualifier	Limits
Isotope Dilution	%Recovery			
18O2 PFHxS	124			23 0135
1/p 40PFHA9	153			23 0135
1/p 4 PFO9	113			23 0135
1/p 4 PFOS	12-			23 0135
1/p 3 PFN9	118			23 0135

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TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-20105-1

LCMS

Prep Batch: 118744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20105-1	87301	Total/NA	Water	PFAS Prep	
320-20105-2	92959	Total/NA	Water	PFAS Prep	
320-20105-3	87335	Total/NA	Water	PFAS Prep	
320-20105-4	671281	Total/NA	Water	PFAS Prep	
320-20105-5	536555-3	Total/NA	Water	PFAS Prep	
320-20105-6	92924	Total/NA	Water	PFAS Prep	
320-20105-7	87416	Total/NA	Water	PFAS Prep	
320-20105-8	87516	Total/NA	Water	PFAS Prep	
320-20105-9	92711	Total/NA	Water	PFAS Prep	
320-20105-10	127124	Total/NA	Water	PFAS Prep	
320-20105-11	MW-710	Total/NA	Water	PFAS Prep	
320-20105-12	MW-508A	Total/NA	Water	PFAS Prep	
320-20105-13	MW-705A	Total/NA	Water	PFAS Prep	
320-20105-14	MW-705B	Total/NA	Water	PFAS Prep	
320-20105-15	MW-304B	Total/NA	Water	PFAS Prep	
320-20105-16	MW-304A	Total/NA	Water	PFAS Prep	
320-20105-17	EB-304A	Total/NA	Water	PFAS Prep	
MB 320-118744/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-118744/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-118744/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 118880

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20105-13	MW-705A	Total/NA	Water	PFAS	118744
320-20105-14	MW-705B	Total/NA	Water	PFAS	118744
320-20105-15	MW-304B	Total/NA	Water	PFAS	118744
320-20105-16	MW-304A	Total/NA	Water	PFAS	118744

Analysis Batch: 119234

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20105-1	87301	Total/NA	Water	PFAS	118744
320-20105-2	92959	Total/NA	Water	PFAS	118744
320-20105-3	87335	Total/NA	Water	PFAS	118744
320-20105-4	671281	Total/NA	Water	PFAS	118744
320-20105-5	536555-3	Total/NA	Water	PFAS	118744
320-20105-6	92924	Total/NA	Water	PFAS	118744
320-20105-7	87416	Total/NA	Water	PFAS	118744
320-20105-8	87516	Total/NA	Water	PFAS	118744
320-20105-9	92711	Total/NA	Water	PFAS	118744
320-20105-10	127124	Total/NA	Water	PFAS	118744
320-20105-11	MW-710	Total/NA	Water	PFAS	118744
320-20105-12	MW-508A	Total/NA	Water	PFAS	118744
MB 320-118744/1-A	Method Blank	Total/NA	Water	PFAS	118744
LCS 320-118744/2-A	Lab Control Sample	Total/NA	Water	PFAS	118744
LCSD 320-118744/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	118744

Analysis Batch: 119472

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20105-17	EB-304A	Total/NA	Water	PFAS	118744

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: 87301

Date Collected: 07/06/16 09:48

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-1

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 91:0L	SER	TA4 SAC

Client Sample ID: 92959

Date Collected: 07/06/16 10:28

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-2

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 91:8L	SER	TA4 SAC

Client Sample ID: 87335

Date Collected: 07/06/16 11:30

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-3

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 96:0L	SER	TA4 SAC

Client Sample ID: 671281

Date Collected: 07/06/16 12:27

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-4

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 96:2L	SER	TA4 SAC

Client Sample ID: 536555-3

Date Collected: 07/06/16 11:00

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-5

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 96:8L	SER	TA4 SAC

Client Sample ID: 92924

Date Collected: 07/06/16 12:40

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-6

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 97:0L	SER	TA4 SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: 87416

Date Collected: 07/06/16 14:45

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-7

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 97:2L	SER	TA4 SAC

Client Sample ID: 87516

Date Collected: 07/06/16 14:35

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-8

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 97:8L	SER	TA4 SAC

Client Sample ID: 92711

Date Collected: 07/06/16 15:10

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-9

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 9L:0L	SER	TA4 SAC

Client Sample ID: 127124

Date Collected: 07/06/16 15:02

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-10

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 9L:2L	SER	TA4 SAC

Client Sample ID: MW-710

Date Collected: 07/06/16 11:57

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-11

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 95:0L	SER	TA4 SAC

Client Sample ID: MW-508A

Date Collected: 07/06/16 13:43

Date Received: 07/08/16 15:49

Lab Sample ID: 320-20105-12

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995238	07/23/96 95:2L	SER	TA4 SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-20901-9

Client Sample ID: MW-705A

Lab Sample ID: 320-20105-13

Date Collected: 07/06/16 15:20

Matrix: Water

Date Received: 07/08/16 15:49

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			99LLL0	07/22/96 99:16	SER	TA4 SAC

Client Sample ID: MW-705B

Lab Sample ID: 320-20105-14

Date Collected: 07/06/16 16:28

Matrix: Water

Date Received: 07/08/16 15:49

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			99LLL0	07/22/96 92:96	SER	TA4 SAC

Client Sample ID: MW-304B

Lab Sample ID: 320-20105-15

Date Collected: 07/06/16 18:04

Matrix: Water

Date Received: 07/08/16 15:49

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			99LLL0	07/22/96 92:36	SER	TA4 SAC

Client Sample ID: MW-304A

Lab Sample ID: 320-20105-16

Date Collected: 07/06/16 19:01

Matrix: Water

Date Received: 07/08/16 15:49

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			99LLL0	07/22/96 92:16	SER	TA4 SAC

Client Sample ID: EB-304A

Lab Sample ID: 320-20105-17

Date Collected: 07/06/16 19:33

Matrix: Water

Date Received: 07/08/16 15:49

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			9.00 m4	9.66 m4	99L788	07/20/96 96:16	ERW	TA4 SAC
Total/NA	Analysis	PFAS		9			995872	07/21/96 29:96	SER	TA4 SAC

Laboratory References:

TA4 SAC = TestAmerica Sacramento, LL0 Riverside Parkway, West Sacramento, CA 51601, TE4 (596)373-1600

TestAmerica Sacramento

Certification Summary

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

TestAmerica Job ID: 320-20901-9

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 7 LAP		282E-09	09-39-9(
Alaska U ST5	State Program	90	) ST-011	92-9E-96
Arizona	State Program	8	AZ0(0E	0E-99-96 *
Arkansas D7 Q	State Program	6	EE-0689	06-9(-9(
California	State Program	8	2E8(	09-39-9E
Colorado	State Program	E	CA00044	0E-39-96
Connecticut	State Program	9	PH-0689	06-30-9(
Florida	N7 LAP	4	7E(1(0	06-30-9(
Hawaii	State Program	8	N/A	09-39-9(
Illinois	N7 LAP	1	200060	03-9(-9(
Kansas	N7 LAP	(	7-903(1	0(-39-96 *
Louisiana	N7 LAP	6	30692	06-30-9(
Maine	State Program	9	CA0004	04-9E-9E
Michigan	State Program	1	884(	09-39-9E
Nevada	State Program	8	CA00044	0(-39-9(
New Jersey	N7 LAP	2	CA001	06-30-9(
New York	N7 LAP	2	99666	04-09-9(
Oregon	N7 LAP	90	4040	09-28-9(
Pennsylvania	N7 LAP	3	6E-092(2	03-39-9(
Texas	N7 LAP	6	T904(04388	0(-39-9(
) S Fish & Wildlife	Federal		L794E3EE-0	90-39-96
) SDA	Federal		P330-99-00436	92-30-9(
) S7 PA) CMR	Federal	9	CA00044	99-06-96
) tah	N7 LAP	E	CA00044	02-2E-9(
Virginia	N7 LAP	3	4602(E	03-94-9(
Washington	State Program	90	C1E9	01-01-9(
West Virginia UDW5	State Program	3	8830C	92-39-96
Wyoming	State Program	E	ETMS-L	09-28-9(

* Certification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

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

TestAmerica Job ID: 320-20901-9

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 51601, TEL (596)373-1600

Sample Summary

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

TestAmerica Job ID: 320-20105-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-20105-1	87301	Water	07/06/16 09:48	07/08/16 15:49
320-20105-2	92959	Water	07/06/16 10:28	07/08/16 15:49
320-20105-3	87335	Water	07/06/16 11:30	07/08/16 15:49
320-20105-4	671281	Water	07/06/16 12:27	07/08/16 15:49
320-20105-5	536555-3	Water	07/06/16 11:00	07/08/16 15:49
320-20105-6	92924	Water	07/06/16 12:40	07/08/16 15:49
320-20105-7	87416	Water	07/06/16 14:45	07/08/16 15:49
320-20105-8	87516	Water	07/06/16 14:35	07/08/16 15:49
320-20105-9	92711	Water	07/06/16 15:10	07/08/16 15:49
320-20105-10	127124	Water	07/06/16 15:02	07/08/16 15:49
320-20105-11	MW-710	Water	07/06/16 11:57	07/08/16 15:49
320-20105-12	MW-508A	Water	07/06/16 13:43	07/08/16 15:49
320-20105-13	MW-705A	Water	07/06/16 15:20	07/08/16 15:49
320-20105-14	MW-705B	Water	07/06/16 16:28	07/08/16 15:49
320-20105-15	MW-304B	Water	07/06/16 18:04	07/08/16 15:49
320-20105-16	MW-304A	Water	07/06/16 19:01	07/08/16 15:49
320-20105-17	EB-304A	Water	07/06/16 19:33	07/08/16 15:49



320-20105 Chain of Custody

SHANNON & WILSON, INC.

Geotechnical and Environmental Consultants

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
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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 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	PKS	PKS	PKS	Total Number of Containers	Remarks/Matrix
87301		0948	7/6/16	✓	✓	PKS	PKS	PKS	2	Groundwater
92959		1028		✓	✓	PKS	PKS	PKS	2	
87335		1130		✓	✓	PKS	PKS	PKS	2	
671281		1227		✓	✓	PKS	PKS	PKS	2	
536555-3		1100		✓	✓	PKS	PKS	PKS	2	
92924		1240		✓	✓	PKS	PKS	PKS	2	
87416		1445		✓	✓	PKS	PKS	PKS	2	
87516		1435		✓	✓	PKS	PKS	PKS	2	
92711		1510		✓	✓	PKS	PKS	PKS	2	
127124		1502		✓	✓	PKS	PKS	PKS	2	

Project Information Project Number: <u>31-1-1735-025</u> Project Name: <u>Reg. Fire Train. Cont.</u> Contact: <u>MDN/JAK</u> Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: <u>TXG/PKG/MDN</u>		Sample Receipt Total Number of Containers: <u>1</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>[Signature]</u> Time: <u>1100</u> Printed Name: <u>JULIE KOENER</u> Date: <u>7/7/16</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 notify upon sample receipt</u>				Received By: 1. Signature: <u>[Signature]</u> Time: <u>09320</u> Printed Name: <u>Troy G. Tarpen</u> Date: <u>7/8/16</u> Company: <u>TAS</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

No. **33638**



CHAIN-OF-CUSTODY RECORD

Page 2 of 2
Laboratory Test America
Attn: DAVID MURKIN

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

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

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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	PFC's	(WS-LC-0025)	Total Number of Containers	Remarks/Matrix
MW-507 ✓		15:34	7/5/16	X	2			2	Groundwater
MW-607 ✓		15:24	7/5/16	X	2			2	
MW-710 ✓		11:57	7/6/16	X	2			2	
MW-508A ✓		13:43	7/6/16	X	2			2	
MW-705A ✓		15:20	7/6/16	X	2			2	
MW-705B ✓		16:28	7/6/16	X	2			2	
MW-304B ✓		18:04	7/6/16	X	2			2	
MW-304A ✓		19:01	7/6/16	X	2			2	
EB-304A ✓		19:33	7/6/16	X	2			2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735-005</u>		Total Number of Containers <u>18</u>		Signature: <u>Peter Grey</u> Time: <u>8:20</u>		Signature: <u>Julie Keener</u> Time: <u>11:00</u>		Signature: _____ Time: _____	
Project Name: <u>Regional Fire Training Center</u>		COC Seals/Intact? Y/N/NA		Printed Name: <u>Peter Grey</u> Date: <u>7/7/16</u>		Printed Name: <u>JULIE KEENER</u> Date: <u>7/1/16</u>		Printed Name: _____ Date: _____	
Contact: <u>MIA/JAK</u>		Received Good Cond./Cold		Company: <u>SHANNON & WILSON</u>		Company: <u>SHANNON & WILSON</u>		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>FEDEX</u>		Received By: 1. Signature: <u>Julie Keener</u> Time: <u>08:20</u>		Received By: 2. Signature: <u>Troy C. Thompson</u> Time: <u>09:20</u>		Received By: 3. Signature: _____ Time: _____	
Sampler: <u>FX6 Peter Grey</u>		(attach shipping bill, if any)		Printed Name: <u>JULIE KEENER</u> Date: <u>7/7/16</u>		Printed Name: <u>Troy C. Thompson</u> Date: <u>7/8/16</u>		Printed Name: _____ Date: _____	
Instructions				Company: <u>SHANNON & WILSON</u>		Company: <u>TAS</u> <u>9:00C</u> <u>gel ice</u>		Company: _____	
Requested Turnaround Time: <u>STANDARD</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

No. **34059**

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-20901-9

Login Number: 20105

List Source: TestAmerica Sacramento

List Number: 1

Creator: Turpen, Troy

Question	Answer	Comment
Is the sample received in a sealed container or is it in a bag with a seal?	NR	
Are the vials sealed, if present, is intact.	Arue	Seal
Sample vials/seals, if present, are intact.	NR	
Are the vials or samples do not appear to have been compromised or tampered with.	Arue	
Samples were received on ice.	Arue	
Cooler temperature is acceptable.	False	Refer to Job Narrative for details.
Cooler temperature is recorded.	Arue	
Cq C is present.	Arue	
Cq C is filled out in ink and legible.	Arue	
Cq C is filled out with all pertinent information.	Arue	
Is the Field Sampler's name present on Cq C?	NR	
Are there no discrepancies between the containers received and the Cq C.	Arue	
Samples are received within 7 days of being collected (including tests with immediate results)	Arue	
Sample containers have legible labels.	Arue	
Containers are not broken or leaking.	Arue	
Sample collection dates/times are provided.	Arue	
Appropriate sample containers are used.	Arue	
Sample bottles are completely filled.	Arue	
Sample preservation performed.	NR	
There is sufficient vol. for all requested analyses, incl. any requested MSDs	Arue	
Containers receiving zero headspace have no headspace or bubble is < 6mm H ₂ O	Arue	
Multiphasic samples are not present.	Arue	
Samples do not require splitting or compositing.	Arue	
Is residual Chlorine checked.	NR	

Laboratory Data Review Checklist

Completed by: Marcy Nadel

Title: Geologist Date: July 29, 2016

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

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-20105-1

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.

- 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 (9.6°C). However, the sample temperature was also measured, and was within the temperature range specified in the EPA publication SW-846 (5.4°C). 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.

- 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.

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

Comments:

No, 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 notes there was not enough sample volume to analyze MS/MSD samples.

- c. Were all corrective actions documented?

☐Yes ☐No ☒NA (Please explain.)

Comments:

N/A; no corrective actions were required.

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

Comments:

The data quality and usability were not affected.

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:

N/A; no soil samples were 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 level 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:

N/A; PFCs were not detected above the PQL in method blank MB 118744/1-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:

N/A; PFCs were not detected.

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:

N/A; 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:

Yes; 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:

Yes; LCS/LCSD RPDs were within the laboratory RPD limit of 30%.

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

Comments:

N/A; 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:

N/A; no data flags are required.

- 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 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:

N/A; the data did not require flags.

- 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:

No trip blank is required; see above.

- iii. All results less than PQL?
☐ Yes ☐ No ☒ NA (Please explain.) Comments:

No trip blank is required; see above.

iv. If above PQL, what samples are affected?

Comments:

No trip blank is required; see above.

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:

One field duplicate pair was submitted with this WO. However, field duplicates are submitted with a frequency of 10% for the overall project.

ii. Submitted blind to lab?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The field duplicate pair "87416" / "87516" was submitted for 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 RPD values for each of the six analytes meet QC criteria. The maximum RPD for the field duplicate pair was 7.2%.

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.

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

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

Reusable pumps were used during sample collection for six of the samples in this WO. Equipment blank sample "EB-304A" was submitted with this WO.

i. All results less than PQL?

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

Each of the six PFC analytes were not detected in sample "EB-304A."

ii. If above PQL, what samples are affected?

Comments:

N/A; no results were above the PQL.

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: 320-20454-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Julie Keener



Authorized for release by:

8/15/2016 5:51:38 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-20454-1

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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-20454-1

Job ID: 320-20454-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-20454-1

Receipt

The samples were received on 7/25/2016 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 14.6° C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: 536555-5 (320-20454-1), 536-555-4 (320-20454-2), 471372 (320-20454-3), 593460-4 (320-20454-4), 95630 (320-20454-5), 167584 (320-20454-6) and 526410-MW-1 (320-20454-7). Delayed in transit; melted gel packs resting over bag of samples. The client was informed and lab instructed to proceed.

LCMS

Method(s) PFAS: The following 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": 536555-5 (320-20454-1), 536-555-4 (320-20454-2), 471372 (320-20454-3), 593460-4 (320-20454-4), 95630 (320-20454-5), 167584 (320-20454-6) and 526410-MW-1 (320-20454-7)

Method(s) PFAS: The continuing calibration verification (CCV) associated with batch 320-121261 recovered above the upper control limit for Perfluorobutanesulfonic acid (PFBS), Perfluoroheptanoic acid (PFHpA), Perfluorononanoic acid (PFNA) and Perfluorooctanoic acid (PFOA). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following sample is impacted: (CCV 320-121261/50).

Method(s) PFAS: The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: (320-20555-A-4-E MS) and (320-20555-A-4-F MSD). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s). All detection limits are below the lower calibration.

Method(s) PFAS: The continuing calibration verification (CCV) associated with batch 320-121440 recovered above the upper control limit for Perfluorobutanesulfonic acid (PFBS) The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: 536555-5 (320-20454-1), 536-555-4 (320-20454-2), 593460-4 (320-20454-4), 526410-MW-1 (320-20454-7) and (CCV 320-121440/28).

Method(s) PFAS: The continuing calibration verification (CCV) associated with batch 320-121440 recovered above the upper control limit for Perfluorobutanesulfonic acid (PFBS) and Perfluorononanoic acid (PFNA). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: 593460-4 (320-20454-4), 526410-MW-1 (320-20454-7) and (CCV 320-121440/39).

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/sample duplicate (MS/MSD/DUP) associated with analytical batch 320-119526.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with analytical batch 320-121700.

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

Detection Summary

LineSt: h&aSSoS WP inSoS
j ro/ecthite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-20919-C

Client Sample ID: 87288848

9aL Sample ID: 7b34b30804

Mnalyte	1 eAult s ualiQer	19	RD9 f nit	Dil Uac D	RetFoh	drep Pype
j erFidoroobdtaSesdrfoSic aci(B k) hN	4.1	2.0	0.72 SuyL	C	j kAh	Totanj6 A
j erFidoro&e8aSesdrfoSic aci(B kx 8hN	H4	2.0	0.4H SuyL	C	j kAh	Totanj6 A
j erFidoro&eptaSoic aci(B kx pAN	1.5	2.0	0.40 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSoic aci(B kOAN	CC	2.0	0.H1 SuyL	C	j kAh	Totanj6 A
j erFidoroSoSaSoic aci(B k6 AN	2.5	2.0	0.51 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSesdrfoSic aci(B kOhN-DL	H0	90	25 SuyL	20	j kAh	Totanj6 A

Client Sample ID: 87248840

9aL Sample ID: 7b34b30804b

Mnalyte	1 eAult s ualiQer	19	RD9 f nit	Dil Uac D	RetFoh	drep Pype
j erFidoroobdtaSesdrfoSic aci(B k) hN	CC	2.0	0.72 SuyL	C	j kAh	Totanj6 A
j erFidoro&e8aSesdrfoSic aci(B kx 8hN	77	2.0	0.4H SuyL	C	j kAh	Totanj6 A
j erFidoro&eptaSoic aci(B kx pAN	5.1	2.0	0.40 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSoic aci(B kOAN	C2	2.0	0.H1 SuyL	C	j kAh	Totanj6 A
j erFidoroSoSaSoic aci(B k6 AN	2.1	2.0	0.51 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSesdrfoSic aci(B kOhN-DL	H0	90	25 SuyL	20	j kAh	Totanj6 A

Client Sample ID: 0T- 7Tb

9aL Sample ID: 7b34b308047

Mnalyte	1 eAult s ualiQer	19	RD9 f nit	Dil Uac D	RetFoh	drep Pype
j erFidoro&e8aSesdrfoSic aci(B kx 8hN	3.0	2.0	0.4H SuyL	C	j kAh	Totanj6 A
j erFidoro&eptaSoic aci(B kx pAN	C.5 J	2.0	0.40 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSoic aci(B kOAN	2.3	2.0	0.H1 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSesdrfoSic aci(B kOhN	3.3	2.0	C.3 SuyL	C	j kAh	Totanj6 A

Client Sample ID: 86702340

9aL Sample ID: 7b34b308040

Mnalyte	1 eAult s ualiQer	19	RD9 f nit	Dil Uac D	RetFoh	drep Pype
j erFidoroobdtaSesdrfoSic aci(B k) hN	5.3	2.0	0.72 SuyL	C	j kAh	Totanj6 A
j erFidoro&e8aSesdrfoSic aci(B kx 8hN	9C	2.0	0.4H SuyL	C	j kAh	Totanj6 A
j erFidoro&eptaSoic aci(B kx pAN	3.2	2.0	0.40 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSoic aci(B kOAN	1.4	2.0	0.H1 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSesdrfoSic aci(B kOhN	19	2.0	C.3 SuyL	C	j kAh	Totanj6 A
j erFidoroSoSaSoic aci(B k6 AN	0.72 J	2.0	0.51 SuyL	C	j kAh	Totanj6 A

Client Sample ID: 68273

9aL Sample ID: 7b34b308048

Mnalyte	1 eAult s ualiQer	19	RD9 f nit	Dil Uac D	RetFoh	drep Pype
j erFidoroocctaSoic aci(B kOAN	3.9	2.0	0.H1 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSesdrfoSic aci(B kOhN	C7	2.0	C.3 SuyL	C	j kAh	Totanj6 A

Client Sample ID: - 2T850

9aL Sample ID: 7b34b308042

Mnalyte	1 eAult s ualiQer	19	RD9 f nit	Dil Uac D	RetFoh	drep Pype
j erFidoro&e8aSesdrfoSic aci(B kx 8hN	2.0	2.0	0.4H SuyL	C	j kAh	Totanj6 A
j erFidoro&eptaSoic aci(B kx pAN	2.5	2.0	0.40 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSoic aci(B kOAN	3.4	2.0	0.H1 SuyL	C	j kAh	Totanj6 A
j erFidoroocctaSesdrfoSic aci(B kOhN	C.1 J	2.0	C.3 SuyL	C	j kAh	Totanj6 A
j erFidoroSoSaSoic aci(B k6 AN	C2	2.0	0.51 SuyL	C	j kAh	Totanj6 A

T&is DetectioShdmmarf (oes Sot iScrd(e ra(ioc&emicantest resdrts.

TestAmerica hacrameSto

Detection Summary

LineSt: h&aSSoS WP inSoS
j ro/ectyhite: I itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-20919-C

Client Sample ID: 8b20- 34RW4

9aL Sample ID: 7b34b30804

Mnalyte	1 eAut s ualiQer	19	RD9 f nit	Dil Uac D	RetFoh	drep Pype
j erFluorobdtaSesdrfoSoic aci(B k) hN	CC	2.0	0.72 SuYL	C	j kAh	Totany6 A
j erFluoro&e8aSesdrfoSoic aci(B kx 8hN	31	2.0	0.4H SuYL	C	j kAh	Totany6 A
j erFluoro&eptaSoic aci(B kx pAN	1.5	2.0	0.40 SuYL	C	j kAh	Totany6 A
j erFluorooctaSoic aci(B kOAN	4.9	2.0	0.H1 SuYL	C	j kAh	Totany6 A
j erFluorooctaSesdrfoSoic aci(B kOhN	5.5	2.0	C.3 SuYL	C	j kAh	Totany6 A
j erFluoroSoSaSoic aci(B k6 AN	0.H5 J	2.0	0.51 SuYL	C	j kAh	Totany6 A

T&is DetectioShdmmarf (oes Sot iScnd(e ra(ioc&emicantest resdrits.

TestAmerica hacrameSto

Client Sample Results

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

TestAmerica Job ID: 320-20454-1

Client Sample ID: 938999-9

Date CWIeotec: 0d67/ 678 72:30

Date Rooeivec: 0d629678 0h:70

Lab Sample ID: 320-20191-7

4 atMr : x ateM

4 etPwC: FAf S - FeMluWWhatec f ly(I Substanoes									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Ao
FeMluWWhbutanesulWhio aoi	12		2.0	0.92	ng/L		07/26/16 17:01	07/27/16 16:47	1
FAA) S.									
FeMluWWhPer anesulWhio aoi	d/		2.0	0.87	ng/L		07/26/16 17:01	07/27/16 16:47	1
FAOr S.									
FeMluWWhPeptanWo aoi FAAOpf .	92		2.0	0.80	ng/L		07/26/16 17:01	07/27/16 16:47	1
FeMluWWhbtanWo aoi FAA5 f .	77		2.0	0.75	ng/L		07/26/16 17:01	07/27/16 16:47	1
FeMluWWhWhanWo aoi FAJ f .	22		2.0	0.65	ng/L		07/26/16 17:01	07/27/16 16:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	123		20 510-				- 7/26/16 174 1	- 7/27/16 16487	1
1: C3PFHpa	1- 2		20 510-				- 7/26/16 174 1	- 7/27/16 16487	1
1: C3 PFOA	1- 3		20 510-				- 7/26/16 174 1	- 7/27/16 16487	1
1: C3 PFOS	1- 1		20 510-				- 7/26/16 174 1	- 7/27/16 16487	1
1: C0 PF9A	N6		20 510-				- 7/26/16 174 1	- 7/27/16 16487	1

4 etPwC: FAf S - FeMluWWhatec f ly(I Substanoes - DL									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Ao
FeMluWWhbutanesulWhio aoi	dd0		40	26	ng/L		07/26/16 17:01	08/08/16 22:54	20
FAA5 S.									
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	117		20 510-				- 7/26/16 174 1	- 8/- 8/16 22403	2-
1: C3PFHpa	1- 7		20 510-				- 7/26/16 174 1	- 8/- 8/16 22403	2-
1: C3 PFOA	1- 7		20 510-				- 7/26/16 174 1	- 8/- 8/16 22403	2-
1: C3 PFOS	11-		20 510-				- 7/26/16 174 1	- 8/- 8/16 22403	2-
1: C0 PF9A	123		20 510-				- 7/26/16 174 1	- 8/- 8/16 22403	2-

Client Sample ID: 938-999-1

Date CWIeotec: 0d67/ 678 72:02

Date Rooeivec: 0d629678 0h:70

Lab Sample ID: 320-20191-2

4 atMr : x ateM

4 etPwC: FAf S - FeMluWWhatec f ly(I Substanoes									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Ao
FeMluWWhbutanesulWhio aoi	77		2.0	0.92	ng/L		07/26/16 17:01	07/27/16 17:07	1
FAA) S.									
FeMluWWhPer anesulWhio aoi	hh		2.0	0.87	ng/L		07/26/16 17:01	07/27/16 17:07	1
FAOr S.									
FeMluWWhPeptanWo aoi FAAOpf .	82		2.0	0.80	ng/L		07/26/16 17:01	07/27/16 17:07	1
FeMluWWhbtanWo aoi FAA5 f .	72		2.0	0.75	ng/L		07/26/16 17:01	07/27/16 17:07	1
FeMluWWhWhanWo aoi FAJ f .	22		2.0	0.65	ng/L		07/26/16 17:01	07/27/16 17:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	12-		20 510-				- 7/26/16 174 1	- 7/27/16 174 7	1
1: C3PFHpa	1- -		20 510-				- 7/26/16 174 1	- 7/27/16 174 7	1
1: C3 PFOA	1- 7		20 510-				- 7/26/16 174 1	- 7/27/16 174 7	1
1: C3 PFOS	1- 3		20 510-				- 7/26/16 174 1	- 7/27/16 174 7	1
1: C0 PF9A	N0		20 510-				- 7/26/16 174 1	- 7/27/16 174 7	1

4 etPwC: FAf S - FeMluWWhatec f ly(I Substanoes - DL									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Ao
FeMluWWhbutanesulWhio aoi	d10		40	26	ng/L		07/26/16 17:01	08/08/16 23:34	20
FAA5 S.									

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20454-1

Client Sample ID: 938-999-1

Date CWIeotec: 0d6/ 68 72:02

Date Reeivec: 0d62968 0h:70

Lab Sample ID: 320-20191-2

4 atNr : x ateM

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	13-		20 510-	- 7/26/16 174 1	- 8/- 8/16 2: 4 3	2-
1: C3PFHpa	1: 8		20 510-	- 7/26/16 174 1	- 8/- 8/16 2: 4 3	2-
1: C3 PFOA	12N		20 510-	- 7/26/16 174 1	- 8/- 8/16 2: 4 3	2-
1: C3 PFOS	1: 6		20 510-	- 7/26/16 174 1	- 8/- 8/16 2: 4 3	2-
1: C0 PF9A	1: -		20 510-	- 7/26/16 174 1	- 8/- 8/16 2: 4 3	2-

Client Sample ID: 1d73d2

Date CWIeotec: 0d6/ 68 77:27

Date Reeivec: 0d62968 0h:70

Lab Sample ID: 320-20191-3

4 atNr : x ateM

4 etPWc: FAF S - FeMluWWhatec f ly(I Substances									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Aao
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/26/16 17:01	07/27/16 17:27	1
FeMluWWhPer anesulWWhio aoiC	32		2.0	0.87	ng/L		07/26/16 17:01	07/27/16 17:27	1
FAOr S.									
FeMluWWhPeptanWo aoiC FAOpf .	72 N		2.0	0.80	ng/L		07/26/16 17:01	07/27/16 17:27	1
FeMluWWhbtanWo aoiC FA5 f .	22		2.0	0.75	ng/L		07/26/16 17:01	07/27/16 17:27	1
FeMluWWhbtanesulWWhio aoiC	32		2.0	1.3	ng/L		07/26/16 17:01	07/27/16 17:27	1
FA5 S.									
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/26/16 17:01	07/27/16 17:27	1
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	12:		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			
1: C3PFHpa	1- N		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			
1: C3 PFOA	1- N		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			
1: C3 PFOS	122		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			
1: C0 PF9A	1- N		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			

Client Sample ID: 9h3180-1

Date CWIeotec: 0d6/ 68 77:7h

Date Reeivec: 0d62968 0h:70

Lab Sample ID: 320-20191-1

4 atNr : x ateM

4 etPWc: FAF S - FeMluWWhatec f ly(I Substances									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Aao
FeMluWWhbutanesulWWhio aoiC	82		2.0	0.92	ng/L		07/26/16 17:01	07/27/16 17:47	1
FA) S.									
FeMluWWhPer anesulWWhio aoiC	17		2.0	0.87	ng/L		07/26/16 17:01	07/27/16 17:47	1
FAOr S.									
FeMluWWhPeptanWo aoiC FAOpf .	32		2.0	0.80	ng/L		07/26/16 17:01	07/27/16 17:47	1
FeMluWWhbtanWo aoiC FA5 f .	92		2.0	0.75	ng/L		07/26/16 17:01	07/27/16 17:47	1
FeMluWWhbtanesulWWhio aoiC	91		2.0	1.3	ng/L		07/26/16 17:01	07/27/16 17:47	1
FA5 S.									
FeMluWWhWhanWo aoiC FAJ f .	022 N		2.0	0.65	ng/L		07/26/16 17:01	07/27/16 17:47	1
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	118		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			
1: C3PFHpa	1- 1		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			
1: C3 PFOA	1- 6		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			
1: C3 PFOS	110		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			
1: C0 PF9A	1- 0		20 510-	- 7/26/16 174 1	- 7/27/16 1747	1			

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-20454-1

Client Sample ID: h9830

Date CWleotec: 0d67/ 68 70:19

Date Reeivec: 0d629678 0h:70

Lab Sample ID: 320-20191-9

4 atMr : x ateM

4 etPWc: FAF S - FeMluWWhatec f ly(I Substances									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Aao
FeMluWWhatanWo aoiC BFA5 f .	3zi		2.0	0.75	ng/L		07/26/16 17:01	07/27/16 18:07	1
FeMluWWhatanesulWhio aoiC BFA5 S.	7h		2.0	1.3	ng/L		07/26/16 17:01	07/27/16 18:07	1
Isotope Dilution	%Recovery	Qualifier	Limits						
1: C3 PFOA	1- 8		20 510-						
1: C3 PFOS	121		20 510-						
				Prepared	Analyzed	Dil Fac			
				- 7/26/16 174 1	- 7/27/16 184 7	1			
				- 7/26/16 174 1	- 7/27/16 184 7	1			

Client Sample ID: 78d9/ 1

Date CWleotec: 0d620678 79:99

Date Reeivec: 0d629678 0h:70

Lab Sample ID: 320-20191-8

4 atMr : x ateM

4 etPWc: FAF S - FeMluWWhatec f ly(I Substances									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Aao
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/26/16 17:01	07/27/16 18:27	1
FeMluWWhPer anesulWhio aoiC BFAOr S.	2z0		2.0	0.87	ng/L		07/26/16 17:01	07/27/16 18:27	1
FeMluWWhPeptanWo aoiC BFAOpf .	2z8		2.0	0.80	ng/L		07/26/16 17:01	07/27/16 18:27	1
FeMluWWhatanWo aoiC BFA5 f .	3zi		2.0	0.75	ng/L		07/26/16 17:01	07/27/16 18:27	1
FeMluWWhatanesulWhio aoiC BFA5 S.	7z9 N		2.0	1.3	ng/L		07/26/16 17:01	07/27/16 18:27	1
FeMluWWhWhanWo aoiC BFAJ f .	72		2.0	0.65	ng/L		07/26/16 17:01	07/27/16 18:27	1
Isotope Dilution	%Recovery	Qualifier	Limits						
18O2 PFHxS	123		20 510-						
1: C3PFHpa	113		20 510-						
1: C3 PFOA	113		20 510-						
1: C3 PFOS	123		20 510-						
1: C0 PF9A	12-		20 510-						
				Prepared	Analyzed	Dil Fac			
				- 7/26/16 174 1	- 7/27/16 1847	1			
				- 7/26/16 174 1	- 7/27/16 1847	1			
				- 7/26/16 174 1	- 7/27/16 1847	1			
				- 7/26/16 174 1	- 7/27/16 1847	1			
				- 7/26/16 174 1	- 7/27/16 1847	1			

Client Sample ID: 928170-4 x -7

Date CWleotec: 0d620678 71:21

Date Reeivec: 0d629678 0h:70

Lab Sample ID: 320-20191-d

4 atMr : x ateM

4 etPWc: FAF S - FeMluWWhatec f ly(I Substances									
f nal(te	Result	HualikeM	RL	4 DL	Qnit	D	FMpaMc	f nal(Uec	Dil Aao
FeMluWWhbutanesulWhio aoiC BFA) S.	77		2.0	0.92	ng/L		07/26/16 17:01	07/27/16 18:47	1
FeMluWWhPer anesulWhio aoiC BFAOr S.	39		2.0	0.87	ng/L		07/26/16 17:01	07/27/16 18:47	1
FeMluWWhPeptanWo aoiC BFAOpf .	9z8		2.0	0.80	ng/L		07/26/16 17:01	07/27/16 18:47	1
FeMluWWhatanWo aoiC BFA5 f .	1 zi		2.0	0.75	ng/L		07/26/16 17:01	07/27/16 18:47	1
FeMluWWhatanesulWhio aoiC BFA5 S.	8z8		2.0	1.3	ng/L		07/26/16 17:01	07/27/16 18:47	1
FeMluWWhWhanWo aoiC BFAJ f .	0zi8 N		2.0	0.65	ng/L		07/26/16 17:01	07/27/16 18:47	1
Isotope Dilution	%Recovery	Qualifier	Limits						
18O2 PFHxS	118		20 510-						
1: C3PFHpa	11-		20 510-						
1: C3 PFOA	112		20 510-						
1: C3 PFOS	120		20 510-						
1: C0 PF9A	116		20 510-						
				Prepared	Analyzed	Dil Fac			
				- 7/26/16 174 1	- 7/27/16 1847	1			
				- 7/26/16 174 1	- 7/27/16 1847	1			
				- 7/26/16 174 1	- 7/27/16 1847	1			
				- 7/26/16 174 1	- 7/27/16 1847	1			
				- 7/26/16 174 1	- 7/27/16 1847	1			

TestAmerica Sacramento

Isotope Dilution Summary

I nieSt: h&aSSoS WP iisoS
 j ro/ectyhite: I itf oFkairbaSgs kire TraiSiS5 Area

TestAmerica Job ID: 320-20919-C

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)
320-20919-C	137111-1	C29	C02	C09	C0C	67
320-20919-C - D8	137111-1	C04	C04	C04	C00	C29
320-20919-2	137-111-9	C20	C00	C04	C09	61
320-20919-2 - D8	137-111-9	C90	C3M	C26	C37	C30
320-20919-3	94C342	C23	C06	C06	C22	C06
320-20919-9	163970-9	C0M	C0C	C07	C01	C01
320-20919-1	61730			C0M	C2C	
320-20919-7	C741M9	C29	C09	C09	C29	C20
320-20919-4	127900-L P -C	C0M	C00	C02	C21	C07
8l h 320-006217y2-A	8ab l oStronhampre	C20	C0C	C0C	C0M	C07
8l hD 320-006217y8-A	8ab l oStronhampre Dup	C23	C03	C01	C22	C06
L B 320-006217yC-A	L et&od BraSg	C21	C09	C07	C27	C0C

Surrogate Legend

QMD2 j k=Hh x QMD2 j k=Hh
 C3l 9-j k=pA x C3l 9-j k=pA
 C3l 9 j kOA x C3l 9 j kOA
 C3l 9 j kOh x C3l 9 j kOh
 C3l 1 j kNA x C3l 1 j kNA

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS WP inSoS
j ro/ecthite: I itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-20919-C

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-119256/1-A

Matrix: Water

Analysis Batch: 119874

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 119256

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j erFidoroObdtaSesdrfoSic aci(B k) hN	. D		2L0	0L72	Suy6		04y21yC8 C0:29	04y24yC8 C1:94	C
j erFidoro&eHaSesdrfoSic aci(B kpHhN	. D		2L0	0Lx4	Suy6		04y21yC8 C0:29	04y24yC8 C1:94	C
j erFidoro&e5taSoic aci(B kp5AN	. D		2L0	0Lx0	Suy6		04y21yC8 C0:29	04y24yC8 C1:94	C
j erFidoroOctaSoic aci(B kOAN	. D		2L0	0L41	Suy6		04y21yC8 C0:29	04y24yC8 C1:94	C
j erFidoroOctaSesdrfoSic aci(B kOhN	. D		2L0	CL3	Suy6		04y21yC8 C0:29	04y24yC8 C1:94	C
j erFidoroSoSaSoic aci(B k. AN	. D		2L0	0L81	Suy6		04y21yC8 C0:29	04y24yC8 C1:94	C

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	123		23 0135	5- 72371/ 15624	5- 72- 71/ 1364-	1
1: C4OPFHpa	154		23 0135	5- 72371/ 15624	5- 72- 71/ 1364-	1
1: C4 PFOA	15/		23 0135	5- 72371/ 15624	5- 72- 71/ 1364-	1
1: C4 PFOS	12/		23 0135	5- 72371/ 15624	5- 72- 71/ 1364-	1
1: C3 PF9A	111		23 0135	5- 72371/ 15624	5- 72- 71/ 1364-	1

Lab Sample ID: LCS 320-119256/2-A

Matrix: Water

Analysis Batch: 119874

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 119256

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
j erFidoroObdtaSesdrfoSic aci(B k) hN	C4L4	C3L1		Suy6		48	11 - C94
j erFidoro&eHaSesdrfoSic aci(B kpHhN	CxL2	C3L7		Suy6		48	1x - C3x
j erFidoro&e5taSoic aci(B kp5AN	20L0	C1Lx		Suy6		47	83 - C31
j erFidoroOctaSoic aci(B kOAN	20L0	C8L9		Suy6		x2	83 - C9C
j erFidoroOctaSesdrfoSic aci(B kOhN	CxL8	C3L7		Suy6		41	94 - C82
j erFidoroSoSaSoic aci(B k. AN	20L0	C9L8		Suy6		43	4C- C90

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	125		23 0135
1: C4OPFHpa	151		23 0135
1: C4 PFOA	151		23 0135
1: C4 PFOS	118		23 0135
1: C3 PF9A	15/		23 0135

Lab Sample ID: LCSD 320-119256/3-A

Matrix: Water

Analysis Batch: 119874

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 119256

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
j erFidoroObdtaSesdrfoSic aci(B k) hN	C4L4	C1L0		Suy6		x1	11 - C94	00	30
j erFidoro&eHaSesdrfoSic aci(B kpHhN	CxL2	C1L7		Suy6		x4	1x - C3x	C9	30
j erFidoro&e5taSoic aci(B kp5AN	20L0	C4L1		Suy6		x4	83 - C31	00	30
j erFidoroOctaSoic aci(B kOAN	20L0	CxL0		Suy6		70	83 - C9C	00	30
j erFidoroOctaSesdrfoSic aci(B kOhN	CxL8	C1L9		Suy6		x3	94 - C82	00	30
j erFidoroSoSaSoic aci(B k. AN	20L0	C8L2		Suy6		xC	4C- C90	00	30

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS WP iisoS

Project: hite: I itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-20919-C

LCSD LCSD		
Isotope Dilution	%Recovery	Qualifier
18O2 PFHxS	12:	23 0135
1: C40PFHpA	15:	23 0135
1: C4 PFOA	153	23 0135
1: C4 PFOS	122	23 0135
1: C3 PF9A	15N	23 0135

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

QC Association Summary

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

TestAmerica Job ID: 320-20454-1

LCMS

Prep Batch: 119256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-119256/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-119256/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-119256/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 119526

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20454-1	536555-5	Total/NA	Water	PFAS Prep	
320-20454-1 - DL	536555-5	Total/NA	Water	PFAS Prep	
320-20454-2	536-555-4	Total/NA	Water	PFAS Prep	
320-20454-2 - DL	536-555-4	Total/NA	Water	PFAS Prep	
320-20454-3	471372	Total/NA	Water	PFAS Prep	
320-20454-4	593460-4	Total/NA	Water	PFAS Prep	
320-20454-5	95630	Total/NA	Water	PFAS Prep	
320-20454-6	167584	Total/NA	Water	PFAS Prep	
320-20454-7	526410-MW-1	Total/NA	Water	PFAS Prep	

Analysis Batch: 119874

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20454-1	536555-5	Total/NA	Water	PFAS	119526
320-20454-2	536-555-4	Total/NA	Water	PFAS	119526
320-20454-3	471372	Total/NA	Water	PFAS	119526
320-20454-4	593460-4	Total/NA	Water	PFAS	119526
320-20454-5	95630	Total/NA	Water	PFAS	119526
320-20454-6	167584	Total/NA	Water	PFAS	119526
320-20454-7	526410-MW-1	Total/NA	Water	PFAS	119526
MB 320-119256/1-A	Method Blank	Total/NA	Water	PFAS	119256
LCS 320-119256/2-A	Lab Control Sample	Total/NA	Water	PFAS	119256
LCSD 320-119256/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	119256

Analysis Batch: 121261

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-20454-1 - DL	536555-5	Total/NA	Water	PFAS	119526
320-20454-2 - DL	536-555-4	Total/NA	Water	PFAS	119526

Lab Chronicle

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

TestAmerica Job ID: 320-20454-1

Client Sample ID: 87288848

Date Collected: 6/2/2016 9:73

Date Received: 6/2/2016 3:23

Lab Sample ID: 7934030804

1 atrIM x ater

Arep yBpe	Patch yBpe	Patch 1 ethoW	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5 z mber	Arep areW or s nalBFeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119874	07/27/16 16:47	SER	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS	DL	20			121261	08/08/16 22:54	CBW	TAL SAC

Client Sample ID: 872488840

Date Collected: 6/2/2016 9:39

Date Received: 6/2/2016 3:23

Lab Sample ID: 7934030804

1 atrIM x ater

Arep yBpe	Patch yBpe	Patch 1 ethoW	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5 z mber	Arep areW or s nalBFeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119874	07/27/16 17:07	SER	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS	DL	20			121261	08/08/16 23:34	CBW	TAL SAC

Client Sample ID: 0d- 7d9

Date Collected: 6/2/2016 9:39

Date Received: 6/2/2016 3:23

Lab Sample ID: 7934030804

1 atrIM x ater

Arep yBpe	Patch yBpe	Patch 1 ethoW	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5 z mber	Arep areW or s nalBFeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119874	07/27/16 17:27	SER	TAL SAC

Client Sample ID: 8T702340

Date Collected: 6/2/2016 9:39

Date Received: 6/2/2016 3:23

Lab Sample ID: 7934030804

1 atrIM x ater

Arep yBpe	Patch yBpe	Patch 1 ethoW	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5 z mber	Arep areW or s nalBFeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119874	07/27/16 17:47	SER	TAL SAC

Client Sample ID: T8273

Date Collected: 6/2/2016 3:08

Date Received: 6/2/2016 3:23

Lab Sample ID: 7934030804

1 atrIM x ater

Arep yBpe	Patch yBpe	Patch 1 ethoW	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5 z mber	Arep areW or s nalBFeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119874	07/27/16 18:07	SER	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-20454-1

Client Sample ID: - 2d8/ 0

Date Collected: 7/26/16 - 8:88

Date Received: 7/28/16 2:37:3

Lab Sample ID: 79340308042

1 atrIM x ater

Are y Bpe	Patch y Bpe	Patch 1 ethoW	Rzn	Dil Nactor	Initial smoz nt	Ninal smoz nt	Patch 5 z mber	ArepareW or s nalB FeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119874	07/27/16 18:27	SER	TAL SAC

Client Sample ID: 8920- 341 x 4

Date Collected: 7/26/16 - 0:90

Date Received: 7/28/16 2:37:3

Lab Sample ID: 79340308042

1 atrIM x ater

Are y Bpe	Patch y Bpe	Patch 1 ethoW	Rzn	Dil Nactor	Initial smoz nt	Ninal smoz nt	Patch 5 z mber	ArepareW or s nalB FeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	119526	07/26/16 17:01	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			119874	07/27/16 18:47	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: 320-20454-1

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	12-18-16
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	08-31-16
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	08-31-17
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	10-31-16
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-16
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

TestAmerica Job ID: 320-20454-1

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

LineSt: h&aSSoS WP inSoS
j ro/ectyhite: l itf oFkairbaSgs kire TraiSiS6 Area

TestAmerica Job ID: 320-20919-C

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-20919-C	137111-1	P ater	05yC4yC7 C2:30	05y21yC7 08:00
320-20919-2	137-111-9	P ater	05yC4yC7 C2:02	05y21yC7 08:00
320-20919-3	95C352	P ater	05yC4yC7 CC:2C	05y21yC7 08:00
320-20919-9	183970-9	P ater	05yC4yC7 CC:08	05y21yC7 08:00
320-20919-1	81730	P ater	05yC4yC7 C0:91	05y21yC7 08:00
320-20919-7	C75149	P ater	05y20yC7 C1:11	05y21yC7 08:00
320-20919-5	1279C0-MP -C	P ater	05y20yC7 C9:29	05y21yC7 08:00

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	RFCS Xos/PFOA	6 PFCS (WS-LL-00003)	Total Number of Containers	Remarks/Matrix
536555-5		1230	7/18/16	X			2	2	GW
536555-4		1200	7/18/16	X			2	2	GW
471372		1121	7/18/16	X			2	2	GW
593460-4		1119	7/18/16	X			2	2	GW
95630		1045	7/18/16	X	2			2	GW
167584		1355	7/20/16	X			2	2	GW
526410-MW-1		1424	7/20/16	X			2	2	GW



320-20454 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By:	
Project Number: <u>31-1-11735-005</u>		Total Number of Containers: <u>14</u>		Signature: <u>[Signature]</u> Time: <u>1800</u>		Signature: _____ Time: _____	
Project Name: <u>Reg. Fire Train</u>		GOC Seals/Intact? Y/N/NA		Printed Name: <u>Tiffany Green</u> Date: <u>7/20/16</u>		Printed Name: _____ Date: _____	
Contact: <u>MDN/JAK</u>		Received Good Cond./Cold		Company: <u>Shannon & Wilson</u>		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: <u>FedEx</u>		Company: _____		Company: _____	
Sampler: <u>TXG/MDN</u>		(attach shipping bill, if any)		Received By: 1.		Received By: 2.	
Instructions				Signature: <u>[Signature]</u> Time: <u>0910</u>		Signature: _____ Time: _____	
Requested Turnaround Time: <u>Standard</u>				Printed Name: <u>Connor M. Edman</u> Date: <u>7/25/16</u>		Printed Name: _____ Date: _____	
Special Instructions: <u>Please notify upon sample receipt</u>				Company: <u>JAWS</u> <u>14.6°C</u> <u>gel</u>		Company: _____	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File							

No. 34108

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-20919-T

Login Number: 20454

List Source: TestAmerica Sacramento

List Number: 1

Creator: Turpen, Troy

Question	Answer	Comment
Is the sample receipted or is it being received by the sample receipting agency?	True	
Is the sample receipted, if present, is it valid?	True	Seal
Sample receipted, if present, are they valid?	True	
Is the sample or samples 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 outside required temperature criteria.
Cooler Temperature is recorded?	True	
COC is present?	True	
COC is filled out in its entirety?	True	
COC is filled out with all pertinent information?	True	
Is the Field Sampler's name present on COC?	No	
Is there any discrepancy between the containers received and the COC?	True	
Samples are received within (10 min) of collection. Tests within immediate (15 min)?	True	
Sample containers have legible labels?	True	
Containers are not broken or leaking.	True	
Sample collection dates are provided?	True	
Appropriate sample containers are used?	True	
Sample bottles are completely filled?	True	
Sample Preservation Method?	No	
Is there sufficient volume for all requested analyses, including requested DSDS?	True	
Containers requiring zero headspace have no headspace or bubble is < 4mm x 1/8"?	True	
Multiphasic samples are not present?	True	
Samples do not require splitting or composition.	True	
Is desiccant Chlorine Chelex?	No	

Laboratory Data Review Checklist

Completed by: Marcy Nadel

Title: Geologist Date: August 16, 2016

CS Report Name: City of Fairbanks Fire Training Area Report Date: August 15, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-20454-1

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.

- 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:

The correct analyses were requested; however the name of sample "536555-4" was incorrectly noted as "536-555-4."

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 (14.6°C). The laboratory receipt documentation notes that the shipment was delayed in transit; melted gel packs were observed resting over the bag of samples.

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

☒Yes ☐No ☐NA (Please explain.)

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."

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

☒Yes ☐No ☐NA (Please explain.)

Comments:

Other than the above-range temperature, 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.

- 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 case narrative also included information relating to analysis batches not included in this WO.

The samples were received outside the required temperature criteria.

The continuing calibration verification (CCV) associated with analysis batch 320-121261 recovered above the upper control limit for four analytes (PFBS, PFHpA, PFNA, and PFOA). However, the project samples associated with this analysis batch were analyzed at a dilution for the analysis of PFOS and is the only analyte reported for this analysis batch.

There was not enough sample volume to analyze MS, MSD, or laboratory duplicate samples.

c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

LCS and LCSD samples were reported to assess method performance.

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

Comments:

The data quality and usability were not affected.

Refer to Section 3.b. for assessment of the temperature exceedance.

CCV samples are beyond the scope of a Level II data review, and the target analyte associated with the analysis batch did not have CCV failures. The reported results for this analytical batch are not affected by the QC failure.

The LCS and LCSD samples are sufficient to assess method performance.

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 level 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:

N/A; PFCs were not detected above the PQL in method blank "MB 320-119256/1-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:

PFCs were not detected in the method blank.

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 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:

LCS/LCSD RPDs were within the ADEC DQO limit of 30%. The maximum RPD for this WO was 14%.

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

Comments:

N/A; 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:

Percent recoveries and RPDs were within acceptable limits.

- 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 percent recoveries are within the method recommended 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 percent recoveries are within the method recommended limits.

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; see above.

iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required; see above.

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 with 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.

- 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.

- 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.

- 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, so an equipment blank was not required. This WO contains one groundwater monitoring well sample; however, sample "526410-MW-1" was collected using a peristaltic pump in place of a submersible pump. The sampling equipment for a peristaltic pump is not reusable and an equipment blank is not required.

- i. All results less than PQL?

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

An equipment blank was not required for this project.

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

Comments:

N/A; an equipment blank was not required for this project.

- 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: 320-21466-1

Client Project/Site: City of Fairbanks Fire Training Area

Revision: 1

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Julie Keener



Authorized for release by:

9/23/2016 12:24:42 PM

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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: 320-21466-1

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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-21466-1

Job ID: 320-21466-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-21466-1

Receipt

The samples were received on 9/1/2016 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.1° C and 5.4° C.

LCMS

Method(s) PFAS: The following 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": 168564 (320-21466-1), 515493-1 (320-21466-2), 168211 (320-21466-3), 147486 (320-21466-4), 168980 (320-21466-5), 167631 (320-21466-6), 167801 (320-21466-7), 169048 (320-21466-8), MW-701 (320-21466-9), MW-801 (320-21466-10), 515515 (320-21466-11), 515507 (320-21466-12), 515607 (320-21466-13), 407411 (320-21466-14), 168271 (320-21466-15), 168513 (320-21466-16), 537268 (320-21466-17), 167983 (320-21466-18), 167967 (320-21466-19), 168483 (320-21466-20),

Method(s) PFAS: The following sample 168564 (320-21466-1), 515493-1 (320-21466-2), 168211 (320-21466-3) and 147486 (320-21466-4) had a detection for Perfluorobutanesulfonic acid (PFBS), the samples were re-analyzed and PFBS detections were confirmed. The 2nd analysis is reported. PFBS has been found to be a common laboratory contaminate on the instrument, as such all detections are confirmed by re-analysis.

Method(s) PFAS: The following sample 167631 (320-21466-6), MW-801 (320-21466-10) and 167983 (320-21466-18) had a detection for Perfluorobutanesulfonic acid (PFBS), the sample was re-analyzed and PFBS confirmed. The second analysis is reported. PFBS has been found to be a common laboratory contaminate on the instrument, as such all detections are confirmed by re-analysis.

Method(s) PFAS: The following sample MW-701 (320-21466-9), 515507 (320-21466-12) and 515607 (320-21466-13) had a detection for Perfluorobutanesulfonic acid (PFBS), the sample was re-analyzed and PFBS was not found. The second analysis is reported. PFBS has been found to be a common laboratory contaminate on the instrument, as such all detections are confirmed by re-analysis.

Method(s) PFAS: The following sample 168271 (320-21466-15), 168513 (320-21466-16), 167967 (320-21466-19) and 168483 (320-21466-20) had a detection for Perfluorobutanesulfonic acid (PFBS), the sample was re-analyzed and PFBS confirmed. The second analysis is reported. PFBS has been found to be a common laboratory contaminate on the instrument, as such all detections are confirmed by re-analysis.

Method(s) PFAS: The following sample 537268 (320-21466-17) had a detection for Perfluorobutanesulfonic acid (PFBS), the sample was re-analyzed and PFBS confirmed. The second analysis is reported. PFBS has been found to be a common laboratory contaminate on the instrument, as such all detections are confirmed by re-analysis.

Method(s) PFAS: The initial analysis of sample 168271 (320-21466-15) was reported for PFOS. Due to failing QC controls for other compounds sample was re-analysied on a run with QC in control. A RE suffix was added to PFOS to indicate it was reported from a separate run.

Method(s) PFAS: Sample 515493-1 (320-21466-2) was re-run and reported at diluton for PFNA to bring the analyte within calibration range.

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 320-126718.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-127361.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-127926.

Case Narrative

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

TestAmerica Job ID: 320-21466-1

Job ID: 320-21466-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-127985.

Method(s) PFAS Prep: The following samples 168564 (320-21466-1), 515493-1 (320-21466-2), 168211 (320-21466-3), 147486 (320-21466-4) and 168980 (320-21466-5) have an orange color, and some kind of dark orange material on the bottom.

Method(s) PFAS Prep: The following samples have a light orange color to them, and have some material on the bottom. 167631 (320-21466-6), 167801 (320-21466-7), 169048 (320-21466-8), MW-701 (320-21466-9), MW-801 (320-21466-10), 515515 (320-21466-11), 515507 (320-21466-12), 515607 (320-21466-13), 407411 (320-21466-14), 168271 (320-21466-15), 168513 (320-21466-16), 537268 (320-21466-17), 167983 (320-21466-18), 167967 (320-21466-19) and 168483 (320-21466-20)

Method(s) PFAS Prep: The following samples MW-701 (320-21466-9) and MW-801 (320-21466-10) had some dark floating material on the bottom.

Method(s) PFAS Prep: The following sample 168483 (320-21466-20) had black sediment on the bottom.

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: 320-21466-1

Client Sample ID: 168564

Lab Sample ID: 320-21466-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	28		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	110		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	26		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)	160		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	5.2		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 515493-1

Lab Sample ID: 320-21466-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	8.6		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	68		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	150		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	290		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	78		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA) - DL	1300		100	33	ng/L	50			PFAS	Total/NA

Client Sample ID: 168211

Lab Sample ID: 320-21466-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	19		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	83		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	17		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	38		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	190		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	210		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 147486

Lab Sample ID: 320-21466-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	35		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	180		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	26		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	290		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	56		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 168980

Lab Sample ID: 320-21466-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	8.5		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 167631

Lab Sample ID: 320-21466-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.6		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L	1			PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 167631 (Continued)

Lab Sample ID: 320-21466-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	5.5		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	27		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	62		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	250		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 167801

Lab Sample ID: 320-21466-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	9.2		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.4		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	3.7		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.84	J	2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 169048

Lab Sample ID: 320-21466-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	11		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)	3.0		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	35		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.82	J	2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: MW-701

Lab Sample ID: 320-21466-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	5.1		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: MW-801

Lab Sample ID: 320-21466-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.0		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.5		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)	21		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	1.7	J	2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 515515

Lab Sample ID: 320-21466-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	10		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.9	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	3.5		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	25		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.74	J	2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 515507

Lab Sample ID: 320-21466-12

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 515507 (Continued)

Lab Sample ID: 320-21466-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	8.6		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.7	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	3.1		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	22		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 515607

Lab Sample ID: 320-21466-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	8.5		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	21		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.69	J	2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 407411

Lab Sample ID: 320-21466-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	12		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)	5.6		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)	12		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 168271

Lab Sample ID: 320-21466-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	26		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	150		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	12		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	38		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	140		2.0	0.65	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RA	310		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168513

Lab Sample ID: 320-21466-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	16		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	100		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	10		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	34		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	230		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	160		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 537268

Lab Sample ID: 320-21466-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	8.6		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	68		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)	39		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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-21466-1

Client Sample ID: 537268 (Continued)

Lab Sample ID: 320-21466-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	170		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	200		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 167983

Lab Sample ID: 320-21466-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.0		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	18		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.3		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	20		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	41		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	71		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 167967

Lab Sample ID: 320-21466-19

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)	50		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	19		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	42		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	82		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	300		2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 168483

Lab Sample ID: 320-21466-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	28		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	140		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	42		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	300		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	120		2.0	0.65	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: 320-21466-1

Client Sample ID: 168564

Date Collected: 08/29/16 09:11

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	28		2.0	0.92	ng/L		09/12/16 11:29	09/13/16 12:05	1
Perfluorohexanesulfonic acid (PFHxS)	110		2.0	0.87	ng/L		09/12/16 11:29	09/13/16 12:05	1
Perfluoroheptanoic acid (PFHpA)	26		2.0	0.80	ng/L		09/12/16 11:29	09/13/16 12:05	1
Perfluorooctanoic acid (PFOA)	29		2.0	0.75	ng/L		09/12/16 11:29	09/13/16 12:05	1
Perfluorooctanesulfonic acid (PFOS)	160		2.0	1.3	ng/L		09/12/16 11:29	09/13/16 12:05	1
Perfluorononanoic acid (PFNA)	5.2		2.0	0.65	ng/L		09/12/16 11:29	09/13/16 12:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	81		23 0135				5- 71271/ 1162-	5- 71471/ 12653	1
14: C14PFHpA	83		23 0135				5- 71271/ 1162-	5- 71471/ 12653	1
14: C14PFOA	- 2		23 0135				5- 71271/ 1162-	5- 71471/ 12653	1
14: C14PFOS	8C		23 0135				5- 71271/ 1162-	5- 71471/ 12653	1
14: 3 PF9A	- N		23 0135				5- 71271/ 1162-	5- 71471/ 12653	1

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 515493-1

Date Collected: 08/29/16 11:02

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-2

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	8.6		2.0	0.92	ng/L		09/12/16 11:29	09/13/16 12:23	1
Perfluorohexanesulfonic acid (PFHxS)	68		2.0	0.87	ng/L		09/12/16 11:29	09/13/16 12:23	1
Perfluoroheptanoic acid (PFHpA)	150		2.0	0.80	ng/L		09/12/16 11:29	09/13/16 12:23	1
Perfluorooctanoic acid (PFOA)	290		2.0	0.75	ng/L		09/12/16 11:29	09/13/16 12:23	1
Perfluorooctanesulfonic acid (PFOS)	78		2.0	1.3	ng/L		09/12/16 11:29	09/13/16 12:23	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	8C		23 0135	5- 71271/ 1162-	5- 71471/ 12624	1
14: 13C PFHpA	82		23 0135	5- 71271/ 1162-	5- 71471/ 12624	1
14: 13C PFOA	-5		23 0135	5- 71271/ 1162-	5- 71471/ 12624	1
14: 13C PFOS	8/		23 0135	5- 71271/ 1162-	5- 71471/ 12624	1
14: 3 PF9A	-3		23 0135	5- 71271/ 1162-	5- 71471/ 12624	1

Method: PFAS - Perfluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	1300		100	33	ng/L		09/12/16 11:29	09/16/16 07:14	50
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	/ -		23 0135				5- 71271/ 1162-	5- 71/ 71/ 5N81C	35
14: 13C PFHpA	81		23 0135				5- 71271/ 1162-	5- 71/ 71/ 5N81C	35
14: 13C PFOA	88		23 0135				5- 71271/ 1162-	5- 71/ 71/ 5N81C	35
14: 13C PFOS	154		23 0135				5- 71271/ 1162-	5- 71/ 71/ 5N81C	35
14: 3 PF9A	- C		23 0135				5- 71271/ 1162-	5- 71/ 71/ 5N81C	35

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 168211

Date Collected: 08/29/16 13:30

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-3

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	19		2.0	0.92	ng/L		09/12/16 11:29	09/13/16 12:41	1
Perfluorohexanesulfonic acid (PFHxS)	83		2.0	0.87	ng/L		09/12/16 11:29	09/13/16 12:41	1
Perfluoroheptanoic acid (PFHpA)	17		2.0	0.80	ng/L		09/12/16 11:29	09/13/16 12:41	1
Perfluorooctanoic acid (PFOA)	38		2.0	0.75	ng/L		09/12/16 11:29	09/13/16 12:41	1
Perfluorooctanesulfonic acid (PFOS)	190		2.0	1.3	ng/L		09/12/16 11:29	09/13/16 12:41	1
Perfluorononanoic acid (PFNA)	210		2.0	0.65	ng/L		09/12/16 11:29	09/13/16 12:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	N		23 0135				5- 71271/ 1162-	5- 71471/ 126C1	1
14: C2PFHpA	N2		23 0135				5- 71271/ 1162-	5- 71471/ 126C1	1
14: CPFOA	81		23 0135				5- 71271/ 1162-	5- 71471/ 126C1	1
14: CPFOS	N		23 0135				5- 71271/ 1162-	5- 71471/ 126C1	1
14: 3 PF9A	84		23 0135				5- 71271/ 1162-	5- 71471/ 126C1	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 147486

Date Collected: 08/29/16 14:18

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-4

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	35		2.0	0.92	ng/L		09/12/16 11:29	09/13/16 13:00	1
Perfluorohexanesulfonic acid (PFHxS)	180		2.0	0.87	ng/L		09/12/16 11:29	09/13/16 13:00	1
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L		09/12/16 11:29	09/13/16 13:00	1
Perfluorooctanoic acid (PFOA)	26		2.0	0.75	ng/L		09/12/16 11:29	09/13/16 13:00	1
Perfluorooctanesulfonic acid (PFOS)	290		2.0	1.3	ng/L		09/12/16 11:29	09/13/16 13:00	1
Perfluorononanoic acid (PFNA)	56		2.0	0.65	ng/L		09/12/16 11:29	09/13/16 13:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	N4		23 0135				5- 71271/ 1162-	5- 71471/ 14655	1
14: C2PFHpA	N2		23 0135				5- 71271/ 1162-	5- 71471/ 14655	1
14: C4PFOA	N-		23 0135				5- 71271/ 1162-	5- 71471/ 14655	1
14: C6PFOS	N4		23 0135				5- 71271/ 1162-	5- 71471/ 14655	1
14: 3 PF9A	82		23 0135				5- 71271/ 1162-	5- 71471/ 14655	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 168980

Date Collected: 08/29/16 15:20

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-5

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		09/12/16 11:29	09/13/16 13:18	1
Perfluorohexanesulfonic acid (PFHxS)	8.5		2.0	0.87	ng/L		09/12/16 11:29	09/13/16 13:18	1
Perfluoroheptanoic acid (PFHpA)	1.8 J		2.0	0.80	ng/L		09/12/16 11:29	09/13/16 13:18	1
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.75	ng/L		09/12/16 11:29	09/13/16 13:18	1
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L		09/12/16 11:29	09/13/16 13:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/12/16 11:29	09/13/16 13:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	/ 2		23 0135				5- 71271/ 1162-	5- 71471/ 14618	1
14: CP PFHpA	/ 1		23 0135				5- 71271/ 1162-	5- 71471/ 14618	1
14: CPFOA	/ 8		23 0135				5- 71271/ 1162-	5- 71471/ 14618	1
14: CPFOS	/ 2		23 0135				5- 71271/ 1162-	5- 71471/ 14618	1
14: 3 PF9A	Nt		23 0135				5- 71271/ 1162-	5- 71471/ 14618	1

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 167631

Date Collected: 08/29/16 16:48

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-6

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.6		2.0	0.92	ng/L		09/15/16 12:11	09/16/16 00:12	1
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 00:12	1
Perfluoroheptanoic acid (PFHpA)	5.5		2.0	0.80	ng/L		09/15/16 12:11	09/16/16 00:12	1
Perfluorooctanoic acid (PFOA)	27		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 00:12	1
Perfluorooctanesulfonic acid (PFOS)	62		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 00:12	1
Perfluorononanoic acid (PFNA)	250		2.0	0.65	ng/L		09/15/16 12:11	09/16/16 00:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	NN		23 0135				5- 71371/ 12611	5- 71/ 71/ 55612	1
14: C14PFHpA	NN		23 0135				5- 71371/ 12611	5- 71/ 71/ 55612	1
14: C14PFOA	8N		23 0135				5- 71371/ 12611	5- 71/ 71/ 55612	1
14: C14PFOS	81		23 0135				5- 71371/ 12611	5- 71/ 71/ 55612	1
14: 3 PF9A	8N		23 0135				5- 71371/ 12611	5- 71/ 71/ 55612	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 167801

Date Collected: 08/30/16 15:30

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-7

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		09/15/16 12:11	09/16/16 00:30	1
Perfluorohexanesulfonic acid (PFHxS)	9.2		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 00:30	1
Perfluoroheptanoic acid (PFHpA)	2.4		2.0	0.80	ng/L		09/15/16 12:11	09/16/16 00:30	1
Perfluorooctanoic acid (PFOA)	3.7		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 00:30	1
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 00:30	1
Perfluorononanoic acid (PFNA)	0.84	J	2.0	0.65	ng/L		09/15/16 12:11	09/16/16 00:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	NC		23 0135				5- 71371/ 12611	5- 71/ 71/ 55615	1
14: C2PFHpA	NH		23 0135				5- 71371/ 12611	5- 71/ 71/ 55615	1
14: CPFOA	8N		23 0135				5- 71371/ 12611	5- 71/ 71/ 55615	1
14: CPFOS	N-		23 0135				5- 71371/ 12611	5- 71/ 71/ 55615	1
14: 3 PF9A	155		23 0135				5- 71371/ 12611	5- 71/ 71/ 55615	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 169048

Date Collected: 08/30/16 14:26

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-8

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		09/15/16 12:11	09/16/16 01:07	1
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 01:07	1
Perfluoroheptanoic acid (PFHpA)	1.3	J	2.0	0.80	ng/L		09/15/16 12:11	09/16/16 01:07	1
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 01:07	1
Perfluorooctanesulfonic acid (PFOS)	35		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 01:07	1
Perfluorononanoic acid (PFNA)	0.82	J	2.0	0.65	ng/L		09/15/16 12:11	09/16/16 01:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	N-		23 0135				5- 71371/ 12611	5- 71/ 71/ 516N	1
14: 00PFHpA	85		23 0135				5- 71371/ 12611	5- 71/ 71/ 516N	1
14: CPFOA	88		23 0135				5- 71371/ 12611	5- 71/ 71/ 516N	1
14: CPFOS	85		23 0135				5- 71371/ 12611	5- 71/ 71/ 516N	1
14: 3 PF9A	- N		23 0135				5- 71371/ 12611	5- 71/ 71/ 516N	1

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: MW-701

Date Collected: 08/30/16 13:00

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-9

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		09/15/16 12:11	09/16/16 01:25	1
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 01:25	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/15/16 12:11	09/16/16 01:25	1
Perfluorooctanoic acid (PFOA)	5.1		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 01:25	1
Perfluorooctanesulfonic acid (PFOS)	21		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 01:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/15/16 12:11	09/16/16 01:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	N3		23 0135				5- 71371/ 12611	5- 71/ 71/ 51623	1
14: C2PFHpA	N2		23 0135				5- 71371/ 12611	5- 71/ 71/ 51623	1
14: CPFOA	N-		23 0135				5- 71371/ 12611	5- 71/ 71/ 51623	1
14: CPFOS	81		23 0135				5- 71371/ 12611	5- 71/ 71/ 51623	1
14: 3 PF9A	8-		23 0135				5- 71371/ 12611	5- 71/ 71/ 51623	1

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: MW-801

Date Collected: 08/30/16 12:50

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-10

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.0		2.0	0.92	ng/L		09/15/16 12:11	09/16/16 01:44	1
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 01:44	1
Perfluoroheptanoic acid (PFHpA)	3.5		2.0	0.80	ng/L		09/15/16 12:11	09/16/16 01:44	1
Perfluorooctanoic acid (PFOA)	5.2		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 01:44	1
Perfluorooctanesulfonic acid (PFOS)	21		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 01:44	1
Perfluorononanoic acid (PFNA)	1.7 J		2.0	0.65	ng/L		09/15/16 12:11	09/16/16 01:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	N5		23 0135				5- 71371/ 12611	5- 71/ 71/ 516CC	1
14: C2PFHpA	//		23 0135				5- 71371/ 12611	5- 71/ 71/ 516CC	1
14: CPFOA	35		23 0135				5- 71371/ 12611	5- 71/ 71/ 516CC	1
14: CPFOS	82		23 0135				5- 71371/ 12611	5- 71/ 71/ 516CC	1
14: 3 PF9A	-1		23 0135				5- 71371/ 12611	5- 71/ 71/ 516CC	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 515515

Date Collected: 08/30/16 11:30

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-11

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		09/15/16 12:11	09/16/16 02:02	1
Perfluorohexanesulfonic acid (PFHxS)	10		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 02:02	1
Perfluoroheptanoic acid (PFHpA)	1.9	J	2.0	0.80	ng/L		09/15/16 12:11	09/16/16 02:02	1
Perfluorooctanoic acid (PFOA)	3.5		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 02:02	1
Perfluorooctanesulfonic acid (PFOS)	25		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 02:02	1
Perfluorononanoic acid (PFNA)	0.74	J	2.0	0.65	ng/L		09/15/16 12:11	09/16/16 02:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	Nf		23 0135				5- 71371/ 12611	5- 71/ 71/ 52652	1
14: 00PFHpA	Nf		23 0135				5- 71371/ 12611	5- 71/ 71/ 52652	1
14: CPFOA	Nf		23 0135				5- 71371/ 12611	5- 71/ 71/ 52652	1
14: CPFOS	8C		23 0135				5- 71371/ 12611	5- 71/ 71/ 52652	1
14: 3 PF9A	155		23 0135				5- 71371/ 12611	5- 71/ 71/ 52652	1

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 515507

Date Collected: 08/30/16 10:35

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-12

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		09/15/16 12:11	09/16/16 02:20	1
Perfluorohexanesulfonic acid (PFHxS)	8.6		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 02:20	1
Perfluoroheptanoic acid (PFHpA)	1.7 J		2.0	0.80	ng/L		09/15/16 12:11	09/16/16 02:20	1
Perfluorooctanoic acid (PFOA)	3.1		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 02:20	1
Perfluorooctanesulfonic acid (PFOS)	22		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 02:20	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/15/16 12:11	09/16/16 02:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	- N		23 0135				5- 71371/ 12611	5- 71/ 71/ 52625	1
14: 00PFHpA	155		23 0135				5- 71371/ 12611	5- 71/ 71/ 52625	1
14: CPFOA	154		23 0135				5- 71371/ 12611	5- 71/ 71/ 52625	1
14: CPFOS	154		23 0135				5- 71371/ 12611	5- 71/ 71/ 52625	1
14: 3 PF9A	122		23 0135				5- 71371/ 12611	5- 71/ 71/ 52625	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 515607

Date Collected: 08/30/16 10:40

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-13

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		09/15/16 12:11	09/16/16 02:39	1
Perfluorohexanesulfonic acid (PFHxS)	8.5		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 02:39	1
Perfluoroheptanoic acid (PFHpA)	1.4	J	2.0	0.80	ng/L		09/15/16 12:11	09/16/16 02:39	1
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 02:39	1
Perfluorooctanesulfonic acid (PFOS)	21		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 02:39	1
Perfluorononanoic acid (PFNA)	0.69	J	2.0	0.65	ng/L		09/15/16 12:11	09/16/16 02:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	-2		23 0135				5- 71371/ 12611	5- 71/ 71/ 5261-	1
14: C11PFHpA	-C		23 0135				5- 71371/ 12611	5- 71/ 71/ 5261-	1
14: CPFOA	151		23 0135				5- 71371/ 12611	5- 71/ 71/ 5261-	1
14: CPFOS	-8		23 0135				5- 71371/ 12611	5- 71/ 71/ 5261-	1
14: 3 PF9A	112		23 0135				5- 71371/ 12611	5- 71/ 71/ 5261-	1

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 407411

Date Collected: 08/30/16 11:20

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-14

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		09/19/16 14:58	09/20/16 02:17	1
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L		09/19/16 14:58	09/20/16 02:17	1
Perfluoroheptanoic acid (PFHpA)	1.5	J	2.0	0.80	ng/L		09/19/16 14:58	09/20/16 02:17	1
Perfluorooctanoic acid (PFOA)	5.6		2.0	0.75	ng/L		09/19/16 14:58	09/20/16 02:17	1
Perfluorooctanesulfonic acid (PFOS)	22		2.0	1.3	ng/L		09/19/16 14:58	09/20/16 02:17	1
Perfluorononanoic acid (PFNA)	12		2.0	0.65	ng/L		09/19/16 14:58	09/20/16 02:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	N-		23 0135				5- 71- 71/ 10688	5- 72571/ 5261N	1
14: 00PFHpA	N3		23 0135				5- 71- 71/ 10688	5- 72571/ 5261N	1
14: CPFOA	88		23 0135				5- 71- 71/ 10688	5- 72571/ 5261N	1
14: CPFOS	- 4		23 0135				5- 71- 71/ 10688	5- 72571/ 5261N	1
14: 3 PF9A	8/		23 0135				5- 71- 71/ 10688	5- 72571/ 5261N	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 168271

Date Collected: 08/30/16 13:24

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-15

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	26		2.0	0.92	ng/L		09/19/16 14:58	09/20/16 02:36	1
Perfluorohexanesulfonic acid (PFHxS)	150		2.0	0.87	ng/L		09/19/16 14:58	09/20/16 02:36	1
Perfluoroheptanoic acid (PFHpA)	12		2.0	0.80	ng/L		09/19/16 14:58	09/20/16 02:36	1
Perfluorooctanoic acid (PFOA)	38		2.0	0.75	ng/L		09/19/16 14:58	09/20/16 02:36	1
Perfluorononanoic acid (PFNA)	140		2.0	0.65	ng/L		09/19/16 14:58	09/20/16 02:36	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	//		23 0135	5- 71- 71/ 10688	5- 72571/ 5264/	1
14: C2PFHpA	/ 1		23 0135	5- 71- 71/ 10688	5- 72571/ 5264/	1
14: CPFOA	N5		23 0135	5- 71- 71/ 10688	5- 72571/ 5264/	1
14: CPFOS	NC		23 0135	5- 71- 71/ 10688	5- 72571/ 5264/	1
14: 3 PF9A	N5		23 0135	5- 71- 71/ 10688	5- 72571/ 5264/	1

Method: PFAS - Perfluorinated Alkyl Substances - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	310		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 03:15	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
14: CPFOS	84		23 0135	5- 71371/ 12611	5- 71/ 71/ 54613	1

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 168513

Date Collected: 08/30/16 13:53

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-16

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	16		2.0	0.92	ng/L		09/19/16 14:58	09/20/16 02:54	1
Perfluorohexanesulfonic acid (PFHxS)	100		2.0	0.87	ng/L		09/19/16 14:58	09/20/16 02:54	1
Perfluoroheptanoic acid (PFHpA)	10		2.0	0.80	ng/L		09/19/16 14:58	09/20/16 02:54	1
Perfluorooctanoic acid (PFOA)	34		2.0	0.75	ng/L		09/19/16 14:58	09/20/16 02:54	1
Perfluorooctanesulfonic acid (PFOS)	230		2.0	1.3	ng/L		09/19/16 14:58	09/20/16 02:54	1
Perfluorononanoic acid (PFNA)	160		2.0	0.65	ng/L		09/19/16 14:58	09/20/16 02:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	83		23 0135				5- 71- 71/ 1088	5- 72571/ 5268C	1
14: C14PFHpA	N		23 0135				5- 71- 71/ 1088	5- 72571/ 5268C	1
14: C14PFOA	- 1		23 0135				5- 71- 71/ 1088	5- 72571/ 5268C	1
14: C14PFOS	- 4		23 0135				5- 71- 71/ 1088	5- 72571/ 5268C	1
14: 3 PF9A	8-		23 0135				5- 71- 71/ 1088	5- 72571/ 5268C	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 537268

Date Collected: 08/30/16 15:02

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-17

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	8.6		2.0	0.92	ng/L		09/19/16 20:07	09/20/16 21:41	1
Perfluorohexanesulfonic acid (PFHxS)	68		2.0	0.87	ng/L		09/19/16 20:07	09/20/16 21:41	1
Perfluoroheptanoic acid (PFHpA)	7.2		2.0	0.80	ng/L		09/19/16 20:07	09/20/16 21:41	1
Perfluorooctanoic acid (PFOA)	39		2.0	0.75	ng/L		09/19/16 20:07	09/20/16 21:41	1
Perfluorooctanesulfonic acid (PFOS)	170		2.0	1.3	ng/L		09/19/16 20:07	09/20/16 21:41	1
Perfluorononanoic acid (PFNA)	200		2.0	0.65	ng/L		09/19/16 20:07	09/20/16 21:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	82		23 0135				5- 71- 71/ 256N	5- 72571/ 216C1	1
14: C10PFHpA	N8		23 0135				5- 71- 71/ 256N	5- 72571/ 216C1	1
14: C11PFOA	- 5		23 0135				5- 71- 71/ 256N	5- 72571/ 216C1	1
14: C12PFOS	88		23 0135				5- 71- 71/ 256N	5- 72571/ 216C1	1
14: C13PF9A	- 4		23 0135				5- 71- 71/ 256N	5- 72571/ 216C1	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 167983

Date Collected: 08/30/16 15:58

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-18

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.0		2.0	0.92	ng/L		09/15/16 12:11	09/16/16 04:29	1
Perfluorohexanesulfonic acid (PFHxS)	18		2.0	0.87	ng/L		09/15/16 12:11	09/16/16 04:29	1
Perfluoroheptanoic acid (PFHpA)	6.3		2.0	0.80	ng/L		09/15/16 12:11	09/16/16 04:29	1
Perfluorooctanoic acid (PFOA)	20		2.0	0.75	ng/L		09/15/16 12:11	09/16/16 04:29	1
Perfluorooctanesulfonic acid (PFOS)	41		2.0	1.3	ng/L		09/15/16 12:11	09/16/16 04:29	1
Perfluorononanoic acid (PFNA)	71		2.0	0.65	ng/L		09/15/16 12:11	09/16/16 04:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	NV		23 0135				5- 71371/ 12611	5- 71/ 71/ 5002-	1
14: C14PFHpA	N8		23 0135				5- 71371/ 12611	5- 71/ 71/ 5002-	1
14: C14PFOA	83		23 0135				5- 71371/ 12611	5- 71/ 71/ 5002-	1
14: C14PFOS	81		23 0135				5- 71371/ 12611	5- 71/ 71/ 5002-	1
14: 3 PF9A	- N		23 0135				5- 71371/ 12611	5- 71/ 71/ 5002-	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 167967

Date Collected: 08/31/16 09:24

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-19

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		09/19/16 14:58	09/20/16 03:31	1
Perfluorohexanesulfonic acid (PFHxS)	50		2.0	0.87	ng/L		09/19/16 14:58	09/20/16 03:31	1
Perfluoroheptanoic acid (PFHpA)	19		2.0	0.80	ng/L		09/19/16 14:58	09/20/16 03:31	1
Perfluorooctanoic acid (PFOA)	42		2.0	0.75	ng/L		09/19/16 14:58	09/20/16 03:31	1
Perfluorooctanesulfonic acid (PFOS)	82		2.0	1.3	ng/L		09/19/16 14:58	09/20/16 03:31	1
Perfluorononanoic acid (PFNA)	300		2.0	0.65	ng/L		09/19/16 14:58	09/20/16 03:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	N8		23 0135				5- 71- 71/ 1088	5- 72571/ 5461	1
14: C2PFHpA	N2		23 0135				5- 71- 71/ 1088	5- 72571/ 5461	1
14: CPFOA	84		23 0135				5- 71- 71/ 1088	5- 72571/ 5461	1
14: CPFOS	8N		23 0135				5- 71- 71/ 1088	5- 72571/ 5461	1
14: 3 PF9A	83		23 0135				5- 71- 71/ 1088	5- 72571/ 5461	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 168483

Date Collected: 08/31/16 09:34

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21466-20

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	28		2.0	0.92	ng/L		09/19/16 14:58	09/20/16 03:49	1
Perfluorohexanesulfonic acid (PFHxS)	140		2.0	0.87	ng/L		09/19/16 14:58	09/20/16 03:49	1
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L		09/19/16 14:58	09/20/16 03:49	1
Perfluorooctanoic acid (PFOA)	42		2.0	0.75	ng/L		09/19/16 14:58	09/20/16 03:49	1
Perfluorooctanesulfonic acid (PFOS)	300		2.0	1.3	ng/L		09/19/16 14:58	09/20/16 03:49	1
Perfluorononanoic acid (PFNA)	120		2.0	0.65	ng/L		09/19/16 14:58	09/20/16 03:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	N8		23 0135				5- 71- 71/ 1088	5- 72571/ 546C	1
14: C2PFHpA	N2		23 0135				5- 71- 71/ 1088	5- 72571/ 546C	1
14: C2PFOA	81		23 0135				5- 71- 71/ 1088	5- 72571/ 546C	1
14: C2PFOS	8C		23 0135				5- 71- 71/ 1088	5- 72571/ 546C	1
14: 3 PF9A	84		23 0135				5- 71- 71/ 1088	5- 72571/ 546C	1

TestAmerica Sacramento

Isotope Dilution Summary

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

TestAmerica Job ID: 320-21466-1

Method: PFAS - Perfluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		¹⁸ O2 PFHx (25-150)	¹³ C4-PFHp (25-150)	¹³ C4 PFOA (25-150)	¹³ C4 PFOS (25-150)	¹³ C5 PFNA (25-150)
320-21466-1	168564	81	85	92	84	97
320-21466-2	515493-1	84	82	90	86	95
320-21466-2 - DL	515493-1	69	81	88	103	94
320-21466-3	168211	76	72	81	76	83
320-21466-4	147486	73	72	79	73	82
320-21466-5	168980	62	61	68	62	71
320-21466-6	167631	77	77	87	81	87
320-21466-7	167801	74	73	87	79	100
320-21466-8	169048	79	80	88	80	97
320-21466-9	MW-701	75	72	79	81	89
320-21466-10	MW-801	70	66	50	82	91
320-21466-11	515515	71	73	79	84	100
320-21466-12	515507	97	100	103	103	122
320-21466-13	515607	92	94	101	98	112
320-21466-14	407411	79	75	88	93	86
320-21466-15 - RA	168271				83	
320-21466-15	168271	66	61	70	74	70
320-21466-16	168513	85	76	91	93	89
320-21466-17	537268	82	78	90	88	93
320-21466-18	167983	77	78	85	81	97
320-21466-19	167967	78	72	83	87	85
320-21466-20	168483	78	72	81	84	83
LCS 320-126718/2-A	Lab Control Sample	80	75	90	88	92
LCS 320-127361/2-A	Lab Control Sample	75	75	81	83	100
LCS 320-127926/2-A	Lab Control Sample	67	62	68	80	71
LCS 320-127985/2-A	Lab Control Sample	70	71	84	85	79
LCSD 320-126718/3-A	Lab Control Sample Dup	83	76	91	86	94
LCSD 320-127361/3-A	Lab Control Sample Dup	71	71	90	85	92
LCSD 320-127926/3-A	Lab Control Sample Dup	67	63	73	78	71
LCSD 320-127985/3-A	Lab Control Sample Dup	71	71	82	84	83
MB 320-126718/1-A	Method Blank	84	81	91	85	94
MB 320-127361/1-A	Method Blank	69	71	87	86	94
MB 320-127926/1-A	Method Blank	69	65	78	81	71
MB 320-127985/1-A	Method Blank	68	60	68	76	78

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

LineSt: h&aSSoS WP inSoS
j ro/ecthite: I itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2910C-9

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-126718/1-A

Matrix: Water

Analysis Batch: 126938

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 126718

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j erFidoroObdtaSesdrfoSic aci(B k) hN	. D		2L0	0L72	Suy6		07/02/0C99:27	07/03/0C99:07	9
j erFidoro&exaSesdrfoSic aci(B kHxhN	. D		2L0	0L48	Suy6		07/02/0C99:27	07/03/0C99:07	9
j erFidoro&eptaSoic aci(B kHpAN	. D		2L0	0L40	Suy6		07/02/0C99:27	07/03/0C99:07	9
j erFidoroOctaSoic aci(B kOAN	. D		2L0	0L85	Suy6		07/02/0C99:27	07/03/0C99:07	9
j erFidoroOctaSesdrfoSic aci(B kOhN	. D		2L0	9L3	Suy6		07/02/0C99:27	07/03/0C99:07	9
j erFidoroSoSaSoic aci(B k. AN	. D		2L0	0LC5	Suy6		07/02/0C99:27	07/03/0C99:07	9

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	83		20 510-	- 7/12/14 11:27	- 7/16/14 11:- 7	1
16C3PFHpA	81		20 510-	- 7/12/14 11:27	- 7/16/14 11:- 7	1
16C3 PFOA	71		20 510-	- 7/12/14 11:27	- 7/16/14 11:- 7	1
16C3 PFOS	80		20 510-	- 7/12/14 11:27	- 7/16/14 11:- 7	1
16C0 PF9A	73		20 510-	- 7/12/14 11:27	- 7/16/14 11:- 7	1

Lab Sample ID: LCS 320-126718/2-A

Matrix: Water

Analysis Batch: 126938

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 126718

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
j erFidoroObdtaSesdrfoSic aci(B k) hN	98L8	20L8		Suy6		998	55 - 918
j erFidoro&exaSesdrfoSic aci(B kHxhN	94L2	20L1		Suy6		992	54 - 934
j erFidoro&eptaSoic aci(B kHpAN	20L0	97L4		Suy6		77	C3 - 935
j erFidoroOctaSoic aci(B kOAN	20L0	23L0		Suy6		995	C3 - 919
j erFidoroOctaSesdrfoSic aci(B kOhN	94LC	97L2		Suy6		903	18 - 9C2
j erFidoroSoSaSoic aci(B k. AN	20L0	22L8		Suy6		993	89 - 910

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	8-		20 510-
16C3PFHpA	NO		20 510-
16C3 PFOA	7-		20 510-
16C3 PFOS	88		20 510-
16C0 PF9A	72		20 510-

Lab Sample ID: LCSD 320-126718/3-A

Matrix: Water

Analysis Batch: 126938

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 126718

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
j erFidoroObdtaSesdrfoSic aci(B k) hN	98L8	97L3		Suy6		907	55 - 918	8	30
j erFidoro&exaSesdrfoSic aci(B kHxhN	94L2	97L7		Suy6		907	54 - 934	2	30
j erFidoro&eptaSoic aci(B kHpAN	20L0	20L0		Suy6		900	C3 - 935	9	30
j erFidoroOctaSoic aci(B kOAN	20L0	22L9		Suy6		999	C3 - 919	1	30
j erFidoroOctaSesdrfoSic aci(B kOhN	94LC	94L2		Suy6		74	18 - 9C2	5	30
j erFidoroSoSaSoic aci(B k. AN	20L0	20L7		Suy6		905	89 - 910	4	30

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS WP inoS
j ro/ecthite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2910C-9

LCS D LCS D

Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	86		20 510-
16C3 PFHxPA	N4		20 510-
16C3 PFOA	71		20 510-
16C3 PFOS	84		20 510-
16C0 PF9A	73		20 510-

Lab Sample ID: MB 320-127361/1-A

Matrix: Water

Analysis Batch: 127444

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 127361

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j erFidoroobdtaSesdrifioSic aci(B k) hN	. D		210	0172	Suy6		07/05/09C 92:99	07/05/09C 23:98	9
j erFidoro&exaSesdrifioSic aci(B kHxhN	. D		210	0148	Suy6		07/05/09C 92:99	07/05/09C 23:98	9
j erFidoro&eptaSoic aci(B kHpAN	. D		210	0140	Suy6		07/05/09C 92:99	07/05/09C 23:98	9
j erFidoroocctaSoic aci(B kOAN	. D		210	0185	Suy6		07/05/09C 92:99	07/05/09C 23:98	9
j erFidoroocctaSesdrifioSic aci(B kOhN	. D		210	913	Suy6		07/05/09C 92:99	07/05/09C 23:98	9
j erFidoroSoSaSoic aci(B k. AN	. D		210	01C5	Suy6		07/05/09C 92:99	07/05/09C 23:98	9

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	47		20 510-	- 7/10/14 12:11	- 7/10/14 26:1N	1
16C3 PFHxPA	N1		20 510-	- 7/10/14 12:11	- 7/10/14 26:1N	1
16C3 PFOA	8N		20 510-	- 7/10/14 12:11	- 7/10/14 26:1N	1
16C3 PFOS	84		20 510-	- 7/10/14 12:11	- 7/10/14 26:1N	1
16C0 PF9A	73		20 510-	- 7/10/14 12:11	- 7/10/14 26:1N	1

Lab Sample ID: LCS 320-127361/2-A

Matrix: Water

Analysis Batch: 127444

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 127361

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
j erFidoroobdtaSesdrifioSic aci(B k) hN	9818	2012		Suy6		991	55 - 918
j erFidoro&exaSesdrifioSic aci(B kHxhN	9412	2219		Suy6		929	54 - 934
j erFidoro&eptaSoic aci(B kHpAN	2010	2315		Suy6		998	C3 - 935
j erFidoroocctaSoic aci(B kOAN	2010	2119		Suy6		920	C3 - 919
j erFidoroocctaSesdrifioSic aci(B kOhN	941C	2917		Suy6		994	18 - 9C2
j erFidoroSoSaSoic aci(B k. AN	2010	2111		Suy6		922	89 - 910

Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	N0		20 510-
16C3 PFHxPA	N0		20 510-
16C3 PFOA	81		20 510-
16C3 PFOS	86		20 510-
16C0 PF9A	1--		20 510-

Lab Sample ID: LCS D 320-127361/3-A

Matrix: Water

Analysis Batch: 127444

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 127361

Analyte	Spike Added	LCS D Result	LCS D Qualifier	Unit	D	%Rec	Limits	RPD	Limit
j erFidoroobdtaSesdrifioSic aci(B k) hN	9818	2012		Suy6		991	55 - 918	0	30
j erFidoro&exaSesdrifioSic aci(B kHxhN	9412	2219		Suy6		929	54 - 934	0	30

TestAmerica hacrameSto

QC Sample Results

Instrument: h&aSSoS WP iisoS
 Location: I itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2910C-9

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-127361/3-A

Matrix: Water

Analysis Batch: 127444

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 127361

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
perfluorooctanoic acid (PF8) H ₂ N	20L0	22L5		Suy6		993	C3 - 935	1	30
perfluorooctanoic acid (PF8) OAN	20L0	23LC		Suy6		994	C3 - 919	2	30
perfluorooctanoic acid (PF8) H ₂ N	94LC	29L3		Suy6		995	18 - 9C2	3	30
perfluorooctanoic acid (PF8) OAN	20L0	21LC		Suy6		923	89 - 910	9	30

Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	N1		20 510-
16C3 PFHpA	N1		20 510-
16C3 PFOA	7-		20 510-
16C3 PFOS	80		20 510-
16C0 PF9A	72		20 510-

Lab Sample ID: MB 320-127926/1-A

Matrix: Water

Analysis Batch: 127944

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 127926

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
perfluorobutanoic acid (PF4) H ₂ N	. D		2L0	0L72	Suy6		07/07/09C91:54	07/20/09C09:22	9
perfluorohexanoic acid (PF6) H ₂ N	. D		2L0	0L48	Suy6		07/07/09C91:54	07/20/09C09:22	9
perfluorooctanoic acid (PF8) H ₂ N	. D		2L0	0L40	Suy6		07/07/09C91:54	07/20/09C09:22	9
perfluorooctanoic acid (PF8) OAN	. D		2L0	0L85	Suy6		07/07/09C91:54	07/20/09C09:22	9
perfluorooctanoic acid (PF8) H ₂ N	. D		2L0	9L3	Suy6		07/07/09C91:54	07/20/09C09:22	9
perfluorooctanoic acid (PF8) OAN	. D		2L0	0LC5	Suy6		07/07/09C91:54	07/20/09C09:22	9

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	47		20 510-	- 7/17/14 13:08	- 7/2-/14 - 1:22	1
16C3 PFHpA	40		20 510-	- 7/17/14 13:08	- 7/2-/14 - 1:22	1
16C3 PFOA	N8		20 510-	- 7/17/14 13:08	- 7/2-/14 - 1:22	1
16C3 PFOS	81		20 510-	- 7/17/14 13:08	- 7/2-/14 - 1:22	1
16C0 PF9A	N1		20 510-	- 7/17/14 13:08	- 7/2-/14 - 1:22	1

Lab Sample ID: LCS 320-127926/2-A

Matrix: Water

Analysis Batch: 127944

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 127926

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
perfluorobutanoic acid (PF4) H ₂ N	98L8	23L3		Suy6		932	55 - 918
perfluorohexanoic acid (PF6) H ₂ N	94L2	21L0		Suy6		932	54 - 934
perfluorooctanoic acid (PF8) H ₂ N	20L0	23L5		Suy6		998	C3 - 935
perfluorooctanoic acid (PF8) OAN	20L0	2C0		Suy6		930	C3 - 919
perfluorooctanoic acid (PF8) H ₂ N	94LC	23L9		Suy6		925	18 - 9C2
perfluorooctanoic acid (PF8) OAN	20L0	25L1		Suy6		928	89 - 910

Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	4N		20 510-
16C3 PFHpA	42		20 510-

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS WP inoS
j ro/ecthite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2910C-9

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-127926/2-A

Matrix: Water

Analysis Batch: 127944

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 127926

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
16C3 PFOA	48		20 510-
16C3 PFOS	8-		20 510-
16C0 PF9A	N1		20 510-

Lab Sample ID: LCSD 320-127926/3-A

Matrix: Water

Analysis Batch: 127944

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 127926

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
j erFidoroobdaSesdrfoSic aci(B k) hN	9818	2218		Suy6		924	55 - 918	3	30
j erFidoro&exaSesdrfoSic aci(B kHxhN	9412	2313		Suy6		924	54 - 934	3	30
j erFidoro&eptaSoic aci(B kHpAN	2010	2315		Suy6		994	C3 - 935	0	30
j erFidoroocctaSoic aci(B kOAN	2010	2118		Suy6		923	C3 - 919	5	30
j erFidoroocctaSesdrfoSic aci(B kOhN	941C	2319		Suy6		925	18 - 9C2	0	30
j erFidoroSoSaSoic aci(B k. AN	2010	2C12		Suy6		939	89 - 910	3	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	4N		20 510-
16C3 PFHpA	46		20 510-
16C3 PFOA	N6		20 510-
16C3 PFOS	N8		20 510-
16C0 PF9A	N1		20 510-

Lab Sample ID: MB 320-127985/1-A

Matrix: Water

Analysis Batch: 128206

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 127985

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j erFidoroobdaSesdrfoSic aci(B k) hN	. D		210	0172	Suy6		07/07/0C20:08	07/20/0C20:1C	9
j erFidoro&exaSesdrfoSic aci(B kHxhN	. D		210	0148	Suy6		07/07/0C20:08	07/20/0C20:1C	9
j erFidoro&eptaSoic aci(B kHpAN	. D		210	0140	Suy6		07/07/0C20:08	07/20/0C20:1C	9
j erFidoroocctaSoic aci(B kOAN	. D		210	0185	Suy6		07/07/0C20:08	07/20/0C20:1C	9
j erFidoroocctaSesdrfoSic aci(B kOhN	. D		210	913	Suy6		07/07/0C20:08	07/20/0C20:1C	9
j erFidoroSoSaSoic aci(B k. AN	. D		210	01C5	Suy6		07/07/0C20:08	07/20/0C20:1C	9

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	48		20 510-	- 7/17/14 2- :- N	- 7/2- /14 2- :34	1
16C3 PFHpA	4-		20 510-	- 7/17/14 2- :- N	- 7/2- /14 2- :34	1
16C3 PFOA	48		20 510-	- 7/17/14 2- :- N	- 7/2- /14 2- :34	1
16C3 PFOS	N4		20 510-	- 7/17/14 2- :- N	- 7/2- /14 2- :34	1
16C0 PF9A	N8		20 510-	- 7/17/14 2- :- N	- 7/2- /14 2- :34	1

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS WP insoS
j ro/ectyhite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2910C-9

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-127985/2-A

Matrix: Water

Analysis Batch: 128206

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 127985

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
j erFluorobdtaSesdrFluSic aci(B k) hN	9818	231C		Suy6		933	55 - 918
j erFluoro&exaSesdrFluSic aci(B kHxhN	9412	2119		Suy6		932	54 - 934
j erFluoro&eptaSoic aci(B kHpAN	2010	221C		Suy6		993	C3 - 935
j erFluorooctaSoic aci(B kOAN	2010	2518		Suy6		924	C3 - 919
j erFluorooctaSesdrFluSic aci(B kOhN	941C	2215		Suy6		929	18 - 9C2
j erFluoroSoSaSoic aci(B k. AN	2010	2019		Suy6		939	89 - 910

Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	N		20 510-
16C3PFHpA	N1		20 510-
16C3 PFOA	83		20 510-
16C3 PFOS	80		20 510-
16C0 PF9A	N7		20 510-

Lab Sample ID: LCSD 320-127985/3-A

Matrix: Water

Analysis Batch: 128206

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 127985

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
j erFluorobdtaSesdrFluSic aci(B k) hN	9818	2212		Suy6		925	55 - 918	C	30
j erFluoro&exaSesdrFluSic aci(B kHxhN	9412	2210		Suy6		929	54 - 934	7	30
j erFluoro&eptaSoic aci(B kHpAN	2010	2214		Suy6		991	C3 - 935	9	30
j erFluorooctaSoic aci(B kOAN	2010	2314		Suy6		997	C3 - 919	4	30
j erFluorooctaSesdrFluSic aci(B kOhN	941C	2918		Suy6		998	18 - 9C2	3	30
j erFluoroSoSaSoic aci(B k. AN	2010	2112		Suy6		929	89 - 910	4	30

Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	N1		20 510-
16C3PFHpA	N1		20 510-
16C3 PFOA	82		20 510-
16C3 PFOS	83		20 510-
16C0 PF9A	86		20 510-

TestAmerica hacrameSto

QC Association Summary

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

TestAmerica Job ID: 320-21466-1

LCMS

Prep Batch: 126718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21466-1	168564	Total/NA	Water	PFAS Prep	
320-21466-2	515493-1	Total/NA	Water	PFAS Prep	
320-21466-2 - DL	515493-1	Total/NA	Water	PFAS Prep	
320-21466-3	168211	Total/NA	Water	PFAS Prep	
320-21466-4	147486	Total/NA	Water	PFAS Prep	
320-21466-5	168980	Total/NA	Water	PFAS Prep	
MB 320-126718/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-126718/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-126718/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 126938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21466-1	168564	Total/NA	Water	PFAS	126718
320-21466-2	515493-1	Total/NA	Water	PFAS	126718
320-21466-3	168211	Total/NA	Water	PFAS	126718
320-21466-4	147486	Total/NA	Water	PFAS	126718
320-21466-5	168980	Total/NA	Water	PFAS	126718
MB 320-126718/1-A	Method Blank	Total/NA	Water	PFAS	126718
LCS 320-126718/2-A	Lab Control Sample	Total/NA	Water	PFAS	126718
LCSD 320-126718/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	126718

Prep Batch: 127361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21466-6	167631	Total/NA	Water	PFAS Prep	
320-21466-7	167801	Total/NA	Water	PFAS Prep	
320-21466-8	169048	Total/NA	Water	PFAS Prep	
320-21466-9	MW-701	Total/NA	Water	PFAS Prep	
320-21466-10	MW-801	Total/NA	Water	PFAS Prep	
320-21466-11	515515	Total/NA	Water	PFAS Prep	
320-21466-12	515507	Total/NA	Water	PFAS Prep	
320-21466-13	515607	Total/NA	Water	PFAS Prep	
320-21466-15 - RA	168271	Total/NA	Water	PFAS Prep	
320-21466-18	167983	Total/NA	Water	PFAS Prep	
MB 320-127361/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-127361/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-127361/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 127444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21466-2 - DL	515493-1	Total/NA	Water	PFAS	126718
320-21466-6	167631	Total/NA	Water	PFAS	127361
320-21466-7	167801	Total/NA	Water	PFAS	127361
320-21466-8	169048	Total/NA	Water	PFAS	127361
320-21466-9	MW-701	Total/NA	Water	PFAS	127361
320-21466-10	MW-801	Total/NA	Water	PFAS	127361
320-21466-11	515515	Total/NA	Water	PFAS	127361
320-21466-12	515507	Total/NA	Water	PFAS	127361
320-21466-13	515607	Total/NA	Water	PFAS	127361
320-21466-15 - RA	168271	Total/NA	Water	PFAS	127361
320-21466-18	167983	Total/NA	Water	PFAS	127361
MB 320-127361/1-A	Method Blank	Total/NA	Water	PFAS	127361

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-21466-1

LCMS (Continued)

Analysis Batch: 127444 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-127361/2-A	Lab Control Sample	Total/NA	Water	PFAS	127361
LCSD 320-127361/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	127361

Prep Batch: 127926

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21466-14	407411	Total/NA	Water	PFAS Prep	
320-21466-15	168271	Total/NA	Water	PFAS Prep	
320-21466-16	168513	Total/NA	Water	PFAS Prep	
320-21466-19	167967	Total/NA	Water	PFAS Prep	
320-21466-20	168483	Total/NA	Water	PFAS Prep	
MB 320-127926/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-127926/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-127926/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 127944

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21466-14	407411	Total/NA	Water	PFAS	127926
320-21466-15	168271	Total/NA	Water	PFAS	127926
320-21466-16	168513	Total/NA	Water	PFAS	127926
320-21466-19	167967	Total/NA	Water	PFAS	127926
320-21466-20	168483	Total/NA	Water	PFAS	127926
MB 320-127926/1-A	Method Blank	Total/NA	Water	PFAS	127926
LCS 320-127926/2-A	Lab Control Sample	Total/NA	Water	PFAS	127926
LCSD 320-127926/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	127926

Prep Batch: 127985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21466-17	537268	Total/NA	Water	PFAS Prep	
MB 320-127985/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-127985/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-127985/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 128206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21466-17	537268	Total/NA	Water	PFAS	127985
MB 320-127985/1-A	Method Blank	Total/NA	Water	PFAS	127985
LCS 320-127985/2-A	Lab Control Sample	Total/NA	Water	PFAS	127985
LCSD 320-127985/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	127985

Lab Chronicle

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 872479

Date Collected: - 20/ 07 - / :88

Date Received: - / 6 807 - / :9-

Lab Sample ID: 30- 10897718

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	126718	09/12/16 11:29	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			126938	09/13/16 12:05	SER	TAL SAC

Client Sample ID: 4849/ 318

Date Collected: - 20/ 07 88:- 0

Date Received: - / 6 807 - / :9-

Lab Sample ID: 30- 10897710

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	126718	09/12/16 11:29	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			126938	09/13/16 12:23	SER	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	126718	09/12/16 11:29	ERW	TAL SAC
Total/NA	Analysis	PFAS	DL	50			127444	09/16/16 07:14	SER	TAL SAC

Client Sample ID: 872088

Date Collected: - 20/ 07 83:3-

Date Received: - / 6 807 - / :9-

Lab Sample ID: 30- 10897713

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	126718	09/12/16 11:29	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			126938	09/13/16 12:41	SER	TAL SAC

Client Sample ID: 895927

Date Collected: - 20/ 07 89:82

Date Received: - / 6 807 - / :9-

Lab Sample ID: 30- 10897719

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	126718	09/12/16 11:29	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			126938	09/13/16 13:00	SER	TAL SAC

Client Sample ID: 872/ 2-

Date Collected: - 20/ 07 84:0-

Date Received: - / 6 807 - / :9-

Lab Sample ID: 30- 10897714

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	126718	09/12/16 11:29	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			126938	09/13/16 13:18	SER	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 875738

Date Collected: - 2017 87 87:92

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 10897717

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 00:12	SER	TAL SAC

Client Sample ID: 8752- 8

Date Collected: - 2017 87 84:3-

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 10897715

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 00:30	SER	TAL SAC

Client Sample ID: 87/ - 92

Date Collected: - 2017 87 89:07

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 10897712

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 01:07	SER	TAL SAC

Client Sample ID: MW15- 8

Date Collected: - 2017 87 83:-

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 10897711

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 01:25	SER	TAL SAC

Client Sample ID: MW12- 8

Date Collected: - 2017 87 80:4-

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 10897718-

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 01:44	SER	TAL SAC

Client Sample ID: 484484

Date Collected: - 2017 87 88:3-

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977188

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 02:02	SER	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 4844- 5

Date Collected: - 26- 87 8- :34

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977180

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 02:20	SER	TAL SAC

Client Sample ID: 4847- 5

Date Collected: - 26- 87 8- :9-

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977183

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 02:39	SER	TAL SAC

Client Sample ID: 9- 5988

Date Collected: - 26- 87 88:0-

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977189

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 mL	1.66 mL	127926	09/19/16 14:58	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127944	09/20/16 02:17	SER	TAL SAC

Client Sample ID: 872058

Date Collected: - 26- 87 83:09

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977184

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	RA		1 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS	RA	1			127444	09/16/16 03:15	SER	TAL SAC
Total/NA	Prep	PFAS Prep			1 mL	1.66 mL	127926	09/19/16 14:58	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127944	09/20/16 02:36	SER	TAL SAC

Client Sample ID: 872483

Date Collected: - 26- 87 83:43

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977187

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 mL	1.66 mL	127926	09/19/16 14:58	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127944	09/20/16 02:54	SER	TAL SAC

Client Sample ID: 435072

Date Collected: - 26- 87 84:- 0

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977185

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 mL	1.66 mL	127985	09/19/16 20:07	VPM	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-21466-1

Client Sample ID: 435072

Date Collected: - 26- 87 84:- 0

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977185

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	PFAS		1			128206	09/20/16 21:41	SER	TAL SAC

Client Sample ID: 875/ 23

Date Collected: - 26- 87 84:42

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 108977182

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 mL	1.66 mL	127361	09/15/16 12:11	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127444	09/16/16 04:29	SER	TAL SAC

Client Sample ID: 875/ 75

Date Collected: - 26887 - / :09

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 10897718/

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 mL	1.66 mL	127926	09/19/16 14:58	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127944	09/20/16 03:31	SER	TAL SAC

Client Sample ID: 872923

Date Collected: - 26887 - / :39

Date Received: - / 6 887 - / :9-

Lab Sample ID: 30- 10897710-

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 mL	1.66 mL	127926	09/19/16 14:58	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			127944	09/20/16 03:49	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: 320-24511-4

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		2928-04	04-34-47
Alaska (UST)	State Program	40	UST-066	42-48-41
Arizona	State Program	9	AZ0708	08-44-47
Arkansas DEQ	State Program	1	88-0194	01-47-47
California	State Program	9	2897	04-34-48
Colorado	State Program	8	CA00055	08-34-47
Connecticut	State Program	4	PH-0194	01-30-47
Florida	NELAP	5	E87670	01-30-47
Hawaii	State Program	9	N/A	04-34-47
Illinois	NELAP	6	200010	03-47-47
Kansas	NELAP	7	E-40376	40-34-41
Louisiana	NELAP	1	30142	01-30-47
Maine	State Program	4	CA0005	05-48-48
Michigan	State Program	6	9957	04-34-48
Nevada	State Program	9	CA00055	07-34-47
New Jersey	NELAP	2	CA006	01-30-47
New York	NELAP	2	44111	05-04-47
Oregon	NELAP	40	5050	04-29-47
Pennsylvania	NELAP	3	18-04272	03-34-47
Texas	NELAP	1	T405705399	07-34-47
US Fish & Wildlife	Federal		LE458388-0	40-34-41
USDA	Federal		P330-44-00531	42-30-47
USEPA UCMR	Federal	4	CA00055	44-01-41
Utah	NELAP	8	CA00055	02-28-47
Virginia	NELAP	3	510278	03-45-47
Washington	State Program	40	C684	06-06-47
West Virginia (DW)	State Program	3	9930C	42-34-41
Wyoming	State Program	8	8TMS-L	04-29-47

Method Summary

Client: Shannon & Wilson

TestAmerica Job ID: 320-24511-4

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 96106, TEL (941)373-6100

Sample Summary

LineSt: h&aSSoS WP inSoS
j ro/ectyhte: I itf oFkairbaSgs kire TraiSiS6 Area

TestAmerica Job ID: 320-2910C-9

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-2910C-9	9C75C1	P ater	07/24/9C 04:99	04/09/9C 04:10
320-2910C-2	595143-9	P ater	07/24/9C 99:02	04/09/9C 04:10
320-2910C-3	9C7299	P ater	07/24/9C 93:30	04/09/9C 04:10
320-2910C-1	91817C	P ater	07/24/9C 91:97	04/09/9C 04:10
320-2910C-5	9C7470	P ater	07/24/9C 95:20	04/09/9C 04:10
320-2910C-C	9C8C39	P ater	07/24/9C 9C:17	04/09/9C 04:10
320-2910C-8	9C8709	P ater	07/80/9C 95:30	04/09/9C 04:10
320-2910C-7	9C4017	P ater	07/80/9C 91:2C	04/09/9C 04:10
320-2910C-4	MP -809	P ater	07/80/9C 93:00	04/09/9C 04:10
320-2910C-90	MP -709	P ater	07/80/9C 92:50	04/09/9C 04:10
320-2910C-99	595595	P ater	07/80/9C 99:30	04/09/9C 04:10
320-2910C-92	595508	P ater	07/80/9C 90:35	04/09/9C 04:10
320-2910C-93	595C08	P ater	07/80/9C 90:10	04/09/9C 04:10
320-2910C-91	108199	P ater	07/80/9C 99:20	04/09/9C 04:10
320-2910C-95	9C7289	P ater	07/80/9C 93:21	04/09/9C 04:10
320-2910C-9C	9C7593	P ater	07/80/9C 93:53	04/09/9C 04:10
320-2910C-98	5382C7	P ater	07/80/9C 95:02	04/09/9C 04:10
320-2910C-97	9C8473	P ater	07/80/9C 95:57	04/09/9C 04:10
320-2910C-94	9C84C8	P ater	07/89/9C 04:21	04/09/9C 04:10
320-2910C-20	9C7173	P ater	07/89/9C 04:31	04/09/9C 04:10

TestAmerica hacrameSto

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Seattle, WA 98103
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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 3
Laboratory Test America
Attn: David Altucher

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Total Number of Containers	Remarks/Matrix
168504		0911	8/29/16	X	2	2	GW
515493-1		1102	8/29/16	X	2	2	
168211		1330	8/29/16	X	2	2	
147486		1418	8/29/16	X	2	2	
168980		1520	8/29/16	X	2	2	
167631		1648	8/29/16	X	2	2	
167801		1530	8/30/16	X	2	2	
169048		1420	8/30/16	X	2	2	
MW-701		1300	8/30/16	X	2	2	
MW-801		1250	8/30/16	X	2	2	



320-21486 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735-006</u>		Total Number of Containers: <u>40</u>		Signature: <u>M. Alapp</u> Time: <u>1000</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>CoFRy Fire Training Center</u>		COC Seals/Intact? Y/N/NA: <u>—</u>		Printed Name: _____ Date: <u>8/31/16</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>Fed Ex</u>		Received By: 1. Signature: <u>Wesley Shockey</u> Time: <u>0740</u>		Received By: 2. Signature: _____ Time: _____		Received By: 3. Signature: _____ Time: _____	
Sampler: <u>TRE/MDN</u>		(attach shipping bill, if any)		Printed Name: <u>Wesley Shockey</u> Date: <u>9/1/16</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>Please notify upon arrival</u>				Company: <u>TWS</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

No. 34188

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 3
Laboratory Test America
Attn: Daniel Altucher

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	XG PFCs (WS-10-0003)						Total Number of Containers	Remarks/Matrix
515515		1130	8/30/16	X	2							2	GUO
515607		1035	8/30/16	X	2							2	
515607		1040	8/30/16	X	2							2	
407411		1120	8/30/16	X	2							2	
108271		1324	8/30/16	V	2							2	
108513		1353	8/30/16	X	2							2	
537268		1502	8/30/16	X	2							2	
107983		1558	8/30/16	X	2							2	
107983		1558	8/30/16										
107967		0924	8/31/16	X	2							2	↓

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number:		Total Number of Containers: <u>1</u>		Signature: <u>M. Nadel</u> Time: <u>1000</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name:		COC Seals/Intact? Y/N/NA		Printed Name: <u>Marcy Nadel</u> Date: <u>8/31/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact:		Received Good Cond./Cold		Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Ongoing Project? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Delivery Method:							
Sampler:		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time:				Signature: <u>Wesley Shockey</u> Time: <u>0940</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Special Instructions:				Printed Name: <u>Wesley Shockey</u> Date: <u>9/1/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
				Company: <u>TW</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

No. 34189



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

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

Page 3 of 3
Laboratory Test America
Attn: David Altucher

[illegible]

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

No. 34190

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-21466-1

Login Number: 21466

List Source: TestAmerica Sacramento

List Number: 1

Creator: Hytrek, Cheryl

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: Tiffany Green

Title: Environmental Scientist Date: September 23, 2016

CS Report Name: City of Fairbanks Fire Training Area Report Date: September 23, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-21466-1

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.

- 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.

- 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.

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

Comments:

No, 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 notes the following:

1. PFBS has been found to be a common laboratory contaminate on the instrument, as such all detections are confirmed by re-analysis.
2. Some compounds associated with sample 168271 (320-21466-15) failed QC controls.
3. Sample 515493-1 (320-21466-2) was re-run and reported at dilution for PFNA to bring analyte within calibration range.
4. There was not enough sample volume to analyze MS/MSD samples.

- c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

1. PFBS results were confirmed for all samples except samples MW-701 (320-21466-9), 515507 (320-21466-12), and 515607 (320-21466-13). The non-detect results for PFBS for these samples are reported.
2. The sample was re-analysed for PFOS on a run with QC in control.
3. Corrective actions are not necessary.
4. The LCS/LCSDs associated with this work order meet QC requirements, therefore a MS/MSD is not necessary.

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

Comments:

The data quality and usability were not affected.

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:

N/A; no soil samples were 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 level 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:

N/A; PFCs were not detected in the 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:

PFCs were not detected in the method blanks.

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:

N/A; 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:

LCS/LCSD RPDs were within the laboratory RPD limit of 30%.

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

Comments:

N/A; 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:

Percent recoveries and RPDs were within acceptable limits.

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 percent recoveries are within the method recommended 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 percent recoveries are within the method recommended limits of 25% to 150%.

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:

No trip blank is required; see above.

- iii. All results less than PQL?

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

No trip blank is required; see above.

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

Comments:

No trip blank is required; see above.

- 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:

Two field duplicate pairs were submitted with this WO.

- ii. Submitted blind to lab?

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

Field duplicate pair MW-701/MW-801 and 515507/515607 were submitted for determination of six PFC analytes.

- 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 RPDs for both field duplicate samples are within QC criteria, where calculable. However, The analytes PFBS and PFHpA were detected above the RL for MW-801 and not detected in MW-701. The results for these analytes are considered and are flagged 'J' for detected analytes and 'UJ' for non-detect results to identify the imprecision.

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

Comments:

Yes; see above.

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

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

Reusable pumps were used during sample collection for one of the samples in this WO. An equipment blank sample was not submitted with this WO, but equipment blanks are submitted with the appropriate frequency for the overall project.

- i. All results less than PQL?

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

N/A; an equipment blank was not submitted with this WO.

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

Comments:

N/A; no results were above the PQL.

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: 320-21469-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Julie Keener



Authorized for release by:

9/30/2016 4:25:48 PM

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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-21469-1

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, 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: 320-21469-1

Job ID: 320-21469-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-21469-1

Receipt

The sample was received on 9/1/2016 9:40 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

LCMS

Method(s) 537 (modified): The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section. LOT 4311 ANSULITE (320-21469-1), (CCV 320-129152/65), (CCV 320-129152/66), (CCV 320-129152/73), (CCV 320-129152/74), (ICB 320-129152/21), (ICV 320-129152/12), (ICV 320-129152/22), (LCS 320-125833/2-A), (LCSD 320-125833/3-A) and (MB 320-125833/1-A), (CCV 320-129221/31), (CCV 320-129221/32), (CCV 320-129221/40), (CCV 320-129221/41), (CCV 320-129221/54), (CCV 320-129221/55) and (MB 320-125833/1-A)

Method(s) 537 (modified): The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section. (CCV 320-129218/4) and (CCV 320-129218/5)

Method(s) 537 (modified): The low level continuing calibration verification (CCVL) associated with batch 320-129218 recovered above the upper control limit for Perfluorooctanoic acid (PFOA). The samples associated with this CCV was detected below the reporting limit for the affected analytes; 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) 3535: Due to the nature of the sample, a matrix spike/matrix spike duplicate (MS/MSD) was not associated with preparation batch 320-125833. A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) was performed instead.

Method(s) 3535: This sample LOT 4311 ANSULITE (320-21469-1) is a pure AFFF product, and it was extracted at a 250,000X dilution.

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: 320-21469-1

Client Sample ID: LOT 4311 ANSULITE

Lab Sample ID: 320-21469-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	30000000	J B	130000000	29000000	ng/L	1			537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	340000000		130000000	49000000	ng/L	1			537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	47000000	J	130000000	47000000	ng/L	1			537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	56000000	J B	130000000	12000000	ng/L	1			537 (modified)	Total/NA
Perfluoro-n-hexadecanoic acid (PFHxDA)	47000000	J B	130000000	7700000	ng/L	1			537 (modified)	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: 320-21469-1

Client Sample ID: LOT 4311 ANSULITE

Date Collected: 08/30/16 12:20

Date Received: 09/01/16 09:40

Lab Sample ID: 320-21469-1

Matrix: Water

Method: 537 (modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	30000000	J B	130000000	29000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluoropentanoic acid (PFPeA)	ND		130000000	62000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorohexanoic acid (PFHxA)	340000000		130000000	49000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluoroheptanoic acid (PFHpA)	ND		130000000	50000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorooctanoic acid (PFOA)	47000000	J	130000000	47000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorononanoic acid (PFNA)	ND		130000000	41000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorodecanoic acid (PFDA)	ND		130000000	28000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluoroundecanoic acid (PFUnA)	ND		130000000	47000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorododecanoic acid (PFDoA)	ND		130000000	37000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorotridecanoic Acid (PFTriA)	ND		130000000	34000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorotetradecanoic acid (PFTeA)	56000000	J B	130000000	12000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	47000000	J B	130000000	7700000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluoro-n-octadecanoic acid (PFODA)	ND		130000000	42000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorooctane Sulfonate (PFOS)	ND		130000000	80000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorooctane Sulfonamide (FOSA)	ND		130000000	40000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorohexanesulfonic acid (PFHxS)	ND		130000000	54000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorodecanesulfonic acid (PFDS)	ND		130000000	76000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluorobutanesulfonic acid (PFBS)	ND		130000000	57000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		130000000	45000000	ng/L		09/06/16 13:20	09/26/16 16:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C8 FOSA	82		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C4 PFBA	115		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C2 PFHxA	115		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C4 PFOA	121		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C5 PFNA	128		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C2 PFDA	77		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C2 PFUnA	118		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C2 PFDoA	109		25 - 150				09/06/16 13:20	09/26/16 16:26	1
18O2 PFHxS	112		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C4 PFOS	101		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C4-PFHpA	128		25 - 150				09/06/16 13:20	09/26/16 16:26	1
13C5 PFPeA	123		25 - 150				09/06/16 13:20	09/26/16 16:26	1

TestAmerica Sacramento

Isotope Dilution Summary

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

TestAmerica Job ID: 320-21469-1

Method: 537 (modified) - Perfluorinated Hydrocarbons

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	3C8 FOS/ (25-150)	3C4 PFB/ (25-150)	3C2 PFHx (25-150)	3C4 PFO/ (25-150)	3C5 PFN/ (25-150)	3C2 PFD/ (25-150)	3C2 PFUn (25-150)	3C2 PFDa (25-150)
320-21469-1	LOT 4311 ANSULITE	82	115	115	121	128	77	118	109
LCSD 320-125833/3-A	Lab Control Sample Dup	42	121	117	119	115	122	125	116
MB 320-125833/1-A	Method Blank	34	118	111	115	114	117	116	104

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	3O2 PFHx (25-150)	3C4 PFO/ (25-150)	3C4-PFHp (25-150)	3C5 PFPe (25-150)
320-21469-1	LOT 4311 ANSULITE	112	101	128	123
LCSD 320-125833/3-A	Lab Control Sample Dup	117	116	119	120
MB 320-125833/1-A	Method Blank	112	109	117	120

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C2 PFHxA = 13C2 PFHxA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDaA = 13C2 PFDaA
18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS
13C4-PFHpA = 13C4-PFHpA
13C5 PFPeA = 13C5 PFPeA

QC Sample Results

Instrument: H&ASoS WP iisoS
 Location: I itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2146C-1

Method: 537 (modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-125833/1-A

Matrix: Water

Analysis Batch: 129221

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 125833

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
perfluorobdtaSoic aci(B k) A.	0L991	J	2L0	0L46	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoroHeStaSoic aci(B kj eA.	x D		2L0	0L0C	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro&e7aSoic aci(B kp 7A.	x D		2L0	0L8C	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro&eHtaSoic aci(B kp HA.	x D		2L0	0L0D	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluorooctaSoic aci(B k5 A.	x D		2L0	0L89	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoroSoSaSoic aci(B kx A.	x D		2L0	0L69	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro(ecaSoic aci(B kDA.	x D		2L0	0L44	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluorodS(ecaSoic aci(B kRSA.	x D		2L0	0L89	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro(o(ecaSoic aci(B kDoA.	x D		2L0	0L9O	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluorotri(ecaSoic Aci(B kTriA.	x D		2L0	0L99	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluorotetra(ecaSoic aci(B kTeA.	0L912	J	2L0	0L20	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro-S-&e7a(ecaSoic aci(B kp 7DA.	0LC20	J	2L0	0L12	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro-S-octa(ecaSoic aci(B k5 DA.	x D		2L0	0L68	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluorooctaSe hdnfoSate B k5 h.	x D		2L0	1L3	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluorooctaSe hdnfoSami(e Bk5 hA.	x D		2L0	0L64	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro&e7aSesdnfoSic aci(B kp 7h.	x D		2L0	0L08	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro(ecaSesdnfoSic aci(B kDh.	x D		2L0	1L2	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluorobdtaSesdnfoSic aci(B k) h.	x D		2L0	0LC2	SuyN		0Q06y16 13:20	0Q26y16 18:96	1
perfluoro&eHtaSesdnfoSic Aci(B kp Hh.	x D		2L0	0L81	SuyN		0Q06y16 13:20	0Q26y16 18:96	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	32		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C2 BFHA	118		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C5 BFx NA	111		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C2 BFOA	11-		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C- BFDA	112		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C5 BF7 A	114		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C5 BFUnA	11:		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C5 BF7 oA	192		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
18O5 BFx NS	115		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C2 BFOS	19/		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C20BFx pA	114		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1
13C- BFBeA	159		5- 01-9	9/ 0: 0: 13P59	9/ 0: 0: 14P:	1

Lab Sample ID: LCSD 320-125833/3-A

Matrix: Water

Analysis Batch: 129152

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 125833

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
perfluorobdtaSoic aci(B k) A.	40L0	36L1		SuyN		00	84 - 130	1	30
perfluoroHeStaSoic aci(B kj eA.	40L0	34L3		SuyN		06	6C- 134	0	30
perfluoro&e7aSoic aci(B kp 7A.	40L0	36L9		SuyN		C1	80 - 136	1	30
perfluoro&eHtaSoic aci(B kp HA.	40L0	39L4		SuyN		00	63 - 139	2	30
perfluorooctaSoic aci(B k5 A.	40L0	46LC		SuyN		118	63 - 141	10	30
perfluoroSoSaSoic aci(B kx A.	40L0	39L6		SuyN		0C	81 - 140	16	30
perfluoro(ecaSoic aci(B kDA.	40L0	34L2		SuyN		06	66 - 141	3	30

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QC Sample Results

LineSt: h&aSSoS WP insoS
j ro/ectyhite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2146C-1

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

Lab Sample ID: LCSD 320-125833/3-A

Matrix: Water

Analysis Batch: 129152

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 125833

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
j erFidorodS(ecaSoic aci(B k RSA.	40L0	32L9		SuyN		01	60- 13C	6	30
j erFidoro(o(ecaSoic aci(B k DoA.	40L0	34L9		SuyN		06	81 - 13C	6	30
j erFidorotri(ecaSoic Aci(B k TriA.	40L0	39L6		SuyN		0C	91 - 13C	9	30
j erFidorotetra(ecaSoic aci(B k TeA.	40L0	38L9		SuyN		04	48 - 130	4	30
j erFidoro-S-&e7a(ecaSoic aci(B kp 7DA.	40L0	20L6		SuyN		84	90 - 190	0	30
j erFidoro-S-octa(ecaSoic aci(B k 5 DA.	40L0	40L8		SuyN		102	90 - 190	12	30
j erFidoroocctaSe h drioSate B k 5 h.	38L1	31L1		SuyN		04	48 - 162	3	30
j erFidoroocctaSe h drioSami(e B k 5 h A.	40L0	36L3		SuyN		C1	9C- 163	4	30
j erFidoro&e7aSesdrioSic aci(B kp 7h.	36L4	33L1		SuyN		C1	90- 130	1	30
j erFidoro(ecaSesdrioSic aci(B k Dh.	30L6	32L8		SuyN		09	39 - 198	9	30
j erFidorobdtaSesdrioSic aci(B k) h.	39L4	32L9		SuyN		C2	99 - 148	2	30
j erFidoro&ehtaSesdrioSic Aci(B kp Hh.	30L1	34L6		SuyN		C1	32 - 180	9	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C8 FOSA	25		5- 01- 9
13C2 BFHA	151		5- 01- 9
13C5 BFx NA	114		5- 01- 9
13C2 BFOA	11/		5- 01- 9
13C- BFDA	11-		5- 01- 9
13C5 BF7 A	155		5- 01- 9
13C5 BFUnA	15-		5- 01- 9
13C5 BF7 oA	11:		5- 01- 9
18O5 BFx NS	114		5- 01- 9
13C2 BFOS	11:		5- 01- 9
13C20BFx pA	11/		5- 01- 9
13C- BFBeA	159		5- 01- 9

TestAmerica hacrameSto

QC Association Summary

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

TestAmerica Job ID: 320-21469-1

LCMS

Prep Batch: 125833

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21469-1	LOT 4311 ANSULITE	Total/NA	Water	3535	
MB 320-125833/1-A	Method Blank	Total/NA	Water	3535	
LCSD 320-125833/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 129152

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 320-125833/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	125833

Analysis Batch: 129221

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21469-1	LOT 4311 ANSULITE	Total/NA	Water	537 (modified)	125833
MB 320-125833/1-A	Method Blank	Total/NA	Water	537 (modified)	125833

Lab Chronicle

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

TestAmerica Job ID: 320-21469-1

Client Sample ID: LOT 4311 ANSULITE

Lab Sample ID: 320-21469-1

Date Collected: 08/30/16 12:20

Matrix: Water

Date Received: 09/01/16 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			0.000004 mL	0.5 mL	125833	09/06/16 13:20	VPM	TAL SAC
Total/NA	Analysis	537 (modified)		1			129221	09/26/16 16:26	CBW	TAL SAC

Laboratory References:

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

Certification Summary

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

TestAmerica Job ID: 320-2451P-4

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Certification ID	Expiration Date
A29A	DoD E9Aj		2P28-04	04-34-47
Alasga (UST)	State j rodram	40	UST-066	42-48-41
Arizona	State j rodram	P	AZ0708	08-44-47
Argansas DEQ	State j rodram	1	88-01P4	01-47-47
Califørnia	State j rodram	P	28P7	04-34-48
Colora. o	State j rodram	8	CA00055	08-34-47
Connecticut	State j rodram	4	j H-01P4	01-30-47
klori. a	p E9Aj	5	E87670	01-30-47
Hawaii	State j rodram	P	p yA	04-34-47
Illinois	p E9Aj	6	200010	03-47-47
Kansas	p E9Aj	7	E-40376	40-34-41
9ouisiana	p E9Aj	1	30142	01-30-47
Maine	State j rodram	4	CA0005	05-48-48
Michidan	State j rodram	6	PP57	04-34-48
p eva. a	State j rodram	P	CA00055	07-34-47
p ew Jersef	p E9Aj	2	CA006	01-30-47
p ew Yorg	p E9Aj	2	44111	05-04-47
Oredon	p E9Aj	40	5050	04-2P-47
j ennsf Ivania	p E9Aj	3	18-04272	03-34-47
Texas	p E9Aj	1	T4057053PP	07-34-47
US kish & Wil. lifē	ke. eral		9E458388-0	40-34-41
USDA	ke. eral		j 330-44-00531	42-30-47
USEj A UCMR	ke. eral	4	CA00055	44-01-41
Utah	p E9Aj	8	CA00055	02-28-47
Virdinia	p E9Aj	3	510278	03-45-47
Washindton	State j rodram	40	C684	06-06-47
West Virdinia (DW)	State j rodram	3	PP30C	42-34-41
Wf omind	State j rodram	8	8TMS-9	04-2P-47

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson

TestAmerica Job ID: 320-21469-1

Project/Site: City of Fairbanks Fire Training Area

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

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

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

Sample Summary

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

TestAmerica Job ID: 320-21469-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-21469-1	LOT 4311 ANSULITE	Water	08/30/16 12:20	09/01/16 09:40



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

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Test America
Attn: David Allthorpe

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

[illegible]

Project Information		Sample Receipt	
Project Number: 31-1-11735-006	Total Number of Containers: 1		
Project Name: Reg Fire Train Gate	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: FedEx		
Sampler: MDN	(attach shipping bill, if any)		

Instructions	
Requested Turnaround Time: Standard	
Special Instructions: Please notify upon arrival	

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. 34187

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-291TR-9

Login Number: 21469

List Source: TestAmerica Sacramento

List Number: 1

Creator: Hytrek, Cheryl

Question	Answer	Comment
c avioaytiwt' k asnt yhey/ ev or is =g bay/ Arounv as measurev b' a surve' meter,	drue	
dhe yooler\$ yustov' sealf ipFresentf is intayt,	drue	
SamFle yustov' sealsf ipFresentf are intayt,	Ngg	
dhe yooler or samFles vo not aFFear to have been yomFromisev or tamFerev k ith,	drue	
SamFles k ere reyeiwev on iye,	drue	
Cooler demFerature is ayyeFtable,	drue	
Cooler demFerature is reyorvev,	drue	
COC is Fresent,	drue	
COC is pllev out in in/ anv leAble,	drue	
COC is pllev out k ith all Fertinent inpprmation,	drue	
Is the ?ielv SamFler\$ name Fresent on COCH	drue	
there are no visyreFanyies betk een the yontainers reyeiwev anv the COC,	drue	
SamFles are reyeiwev k ithin (olvinA dime æ)yluvinA tests k ith immeviate (dsP	drue	
SamFle yontainers have leAble labels,	drue	
Containers are not bro/ en or lea/ inA,	drue	
SamFle yolleytion vategimes are Frowivev,	drue	
qFFroFriate samFle yontainers are usev,	drue	
SamFle bottles are yomFletel' pllev,	drue	
SamFle Vreservation Meripev,	Ngg	
dhere is supplyient wol, por all reDuestev anal' sesf inyl, an' reDuestev z Sg S6 s	drue	
Containers reDuirinA 4ero heavsfaye have no heavsfaye or bubble is =Tmm x9g"P,	drue	
z ultiFhasiy samFles are not Fresent,	drue	
SamFles vo not reDuire sFlittinA or yomFositinA,	drue	
c esivual Chlorine Chey/ ev,	Ngg	

Laboratory Data Review Checklist

Completed by: Marcy Nadel

Title: Geologist Date: September 30, 2016

CS Report Name: City of Fairbanks Fire Training Area Report Date: September 30, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-21469-1

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.

- 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.

- 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.

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

Comments:

No, data quality and usability were not considered 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 case narrative also included information relating to analysis batches not included in this WO (i.e., batch 320-129218).

The injection times displayed in chrom/TALS do not match the injection times listed on A8 instrument printouts. The instrument printout listing the injection times can be found at the end of the run log section.

Due to the nature of the sample, a matrix spike/matrix spike duplicate (MS/MSD) was not associated with preparation batch 320-125833. A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) was performed instead.

This sample LOT 4311 ANSULITE (320-21469-1) is a pure AFFF product, and it was extracted at a 250,000X dilution.

- c. Were all corrective actions documented?

☐Yes ☐No ☒NA (Please explain.)

Comments:

No corrective actions were required.

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

Comments:

The data quality and usability were not affected. CCV samples are beyond the scope of a level II data review; injection times associated with CCV samples are not considered to affect analytical results.

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 7-day hold time for extraction and 40-day hold time for analysis for solid phase extraction (SPE) were met.

c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

No soil samples were 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 greater than the applicable U.S. EPA lifetime drinking water health advisory level and ADEC proposed groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Comments:

We observe that there is not sufficient analytical sensitivity to confirm the absence of not-detected PFC analytes in sample "Lot 4311 Ansulite." However, the data quality and usability are not considered 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:

No, three PFC analytes were detected between the PQL, equivalent to the laboratory RL, and Limit of Detection (LOD) in method blank "MB 320-125833/1-A." These analytes are perfluorobutanoic acid (PFBA), perfluorotetradecanoic acid (PFTeA), and perfluoro-n-hexadecanoic acid (PFHxDA).

iii. If above PQL, what samples are affected?

Comments:

This method blank is associated with project sample "Lot 4311 Ansulite." However, these analytes were detected in the project sample at greater than 10 times the method blank concentration.

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

☐ Yes ☒ No ☐ NA (Please explain.)

Comments:

No; the data are considered unaffected because detected concentrations in the project sample are greater than 10 times the method-blank detection.

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:

Laboratory fortified blanks (LFBs, equivalent to Laboratory Control Samples) 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:

N/A; 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:

Yes; 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:

Yes; RPDs were within the ADEC DQO limit of 30%. The maximum RPD for this WO was 18%.

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

Comments:

N/A; 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:

No data flags are required.

- 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 537 (modified) uses isotope dilution, 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 percent recoveries are within the method recommended 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 data did not require flags.

- 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:

No trip blank is required; see above.

- iii. All results less than PQL?

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

No trip blank is required; see above.

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

Comments:

No trip blank is required; see above.

- 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 work order, but 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.

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.

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.

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, 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 work order.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted with this work order.

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: 320-21927-1

Client Project/Site: City of Fairbanks Fire Training Area

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Julie Keener



Authorized for release by:

10/5/2016 2:25:28 PM

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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: 320-21927-1

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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-21927-1

Job ID: 320-21927-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-21927-1

Comments

No additional comments.

Receipt

The samples were received on 9/21/2016 9:45 AM; the samples 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 following 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": 515469 (320-21927-1), 168467 (320-21927-2), 167886 (320-21927-3), 168424 (320-21927-4), 407429 (320-21927-5), (LCS 320-128587/2-A), (LCSD 320-128587/3-A) and (MB 320-128587/1-A)

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 320-128587.

Method(s) PFAS Prep: The following samples are orange and have some dark material floating around, but sample 320-21927-A-2 is more light brown. 515469 (320-21927-1), 168467 (320-21927-2), 167886 (320-21927-3) and 407429 (320-21927-5)

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-129758.

Method(s) PFAS Prep: The following sample has dark brown sediment on the bottom. 168467 (320-21927-2)

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-130187.

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

Detection Summary

LineSt: h&aSSoS WP insoS
j ro/ecthite: l itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2912C-9

Client Sample ID: 515469

Lab Sample ID: 320-21927-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erFidoro&e(aSesdrfoSic aciB)j kN(h.	Q8		2L0	0L6C	Suy7	9		j	kAh	Totany4 A
j erFidoro&extaSoic aciB)j kNx.A.	9L9	J	2L0	0L60	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSoic aciB)j kH.A.	2LC		2L0	0LQp	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSesdrfoSic aciB)j kHh.	96		2L0	9L3	Suy7	9		j	kAh	Totany4 A

Client Sample ID: 168467

Lab Sample ID: 320-21927-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erFidorobdtaSesdrfoSic aciB)j k5h.	91		2L0	0L12	Suy7	9		j	kAh	Totany4 A
j erFidoro&e(aSesdrfoSic aciB)j kN(h.	920		2L0	0L6C	Suy7	9		j	kAh	Totany4 A
j erFidoro&extaSoic aciB)j kNx.A.	1L8		2L0	0L60	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSoic aciB)j kH.A.	26		2L0	0LQp	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSesdrfoSic aciB)j kHh.	280		2L0	9L3	Suy7	9		j	kAh	Totany4 A
j erFidoroSoSaSoic aciB)j k4 A.	18		2L0	0L8p	Suy7	9		j	kAh	Totany4 A

Client Sample ID: 167886

Lab Sample ID: 320-21927-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erFidorobdtaSesdrfoSic aciB)j k5h.	8L2		2L0	0L12	Suy7	9		j	kAh	Totany4 A
j erFidoro&e(aSesdrfoSic aciB)j kN(h.	31		2L0	0L6C	Suy7	9		j	kAh	Totany4 A
j erFidoro&extaSoic aciB)j kNx.A.	8L1		2L0	0L60	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSoic aciB)j kH.A.	91		2L0	0LQp	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSesdrfoSic aciB)j kHh.	9C0		2L0	9L3	Suy7	9		j	kAh	Totany4 A
j erFidoroSoSaSoic aciB)j k4 A.	63		2L0	0L8p	Suy7	9		j	kAh	Totany4 A

Client Sample ID: 168424

Lab Sample ID: 320-21927-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erFidorobdtaSesdrfoSic aciB)j k5h.	90		2L0	0L12	Suy7	9		j	kAh	Totany4 A
j erFidoro&e(aSesdrfoSic aciB)j kN(h.	990		2L0	0L6C	Suy7	9		j	kAh	Totany4 A
j erFidoro&extaSoic aciB)j kNx.A.	9p		2L0	0L60	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSoic aciB)j kH.A.	2p		2L0	0LQp	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSesdrfoSic aciB)j kHh.	9C0		2L0	9L3	Suy7	9		j	kAh	Totany4 A
j erFidoroSoSaSoic aciB)j k4 A.	20		2L0	0L8p	Suy7	9		j	kAh	Totany4 A

Client Sample ID: 407429

Lab Sample ID: 320-21927-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erFidorobdtaSesdrfoSic aciB)j k5h.	1L8		2L0	0L12	Suy7	9		j	kAh	Totany4 A
j erFidoro&e(aSesdrfoSic aciB)j kN(h.	8C		2L0	0L6C	Suy7	9		j	kAh	Totany4 A
j erFidoro&extaSoic aciB)j kNx.A.	8L8		2L0	0L60	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSoic aciB)j kH.A.	39		2L0	0LQp	Suy7	9		j	kAh	Totany4 A
j erFidoroocctaSesdrfoSic aciB)j kHh.	18		2L0	9L3	Suy7	9		j	kAh	Totany4 A
j erFidoroSoSaSoic aciB)j k4 A.	9p0		2L0	0L8p	Suy7	9		j	kAh	Totany4 A

T&is DetectioShdmarrf Boes Sot iScmlBe raBioc&emicantest resdrtsL

TestAmerica hacrameSto

Client Sample Results

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

TestAmerica Job ID: 320-21927-1

Client Sample ID: 515469

Date Collected: 09/19/16 16:52

Date Received: 09/21/16 09:45

Lab Sample ID: 320-21927-1

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		09/30/16 16:46	09/30/16 23:18	1
Perfluorohexanesulfonic acid (PFHxS)	7.6		2.0	0.87	ng/L		09/30/16 16:46	09/30/16 23:18	1
Perfluoroheptanoic acid (PFHpA)	1.1	J	2.0	0.80	ng/L		09/30/16 16:46	09/30/16 23:18	1
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L		09/30/16 16:46	09/30/16 23:18	1
Perfluorooctanesulfonic acid (PFOS)	18		2.0	1.3	ng/L		09/30/16 16:46	09/30/16 23:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/30/16 16:46	09/30/16 23:18	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
18O2 PFHxS	130		25 - 153				37/63/14 14:04	37/63/14 26:18	1
16C0-PFHpA	79		25 - 153				37/63/14 14:04	37/63/14 26:18	1
16C0 PFOA	130		25 - 153				37/63/14 14:04	37/63/14 26:18	1
16C0 PFOS	134		25 - 153				37/63/14 14:04	37/63/14 26:18	1
16C5 PFNA	134		25 - 153				37/63/14 14:04	37/63/14 26:18	1

Client Sample Results

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

TestAmerica Job ID: 320-21927-1

Client Sample ID: 168467

Date Collected: 09/19/16 16:52

Date Received: 09/21/16 09:45

Lab Sample ID: 320-21927-2

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	19		2.0	0.92	ng/L		09/30/16 16:46	09/30/16 23:37	1
Perfluorohexanesulfonic acid (PFHxS)	120		2.0	0.87	ng/L		09/30/16 16:46	09/30/16 23:37	1
Perfluoroheptanoic acid (PFHpA)	9.6		2.0	0.80	ng/L		09/30/16 16:46	09/30/16 23:37	1
Perfluorooctanoic acid (PFOA)	28		2.0	0.75	ng/L		09/30/16 16:46	09/30/16 23:37	1
Perfluorooctanesulfonic acid (PFOS)	260		2.0	1.3	ng/L		09/30/16 16:46	09/30/16 23:37	1
Perfluorononanoic acid (PFNA)	96		2.0	0.65	ng/L		09/30/16 16:46	09/30/16 23:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	137		25 - 153				37/63/14 14:04	37/63/14 26:69	1
16C0-PFHpa	136		25 - 153				37/63/14 14:04	37/63/14 26:69	1
16C0 PFOA	113		25 - 153				37/63/14 14:04	37/63/14 26:69	1
16C0 PFOS	137		25 - 153				37/63/14 14:04	37/63/14 26:69	1
16C5 PFNA	112		25 - 153				37/63/14 14:04	37/63/14 26:69	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21927-1

Client Sample ID: 167886

Date Collected: 09/19/16 15:20

Date Received: 09/21/16 09:45

Lab Sample ID: 320-21927-3

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	6.2		2.0	0.92	ng/L		09/30/16 16:46	09/30/16 23:55	1
Perfluorohexanesulfonic acid (PFHxS)	39		2.0	0.87	ng/L		09/30/16 16:46	09/30/16 23:55	1
Perfluoroheptanoic acid (PFHpA)	6.9		2.0	0.80	ng/L		09/30/16 16:46	09/30/16 23:55	1
Perfluorooctanoic acid (PFOA)	19		2.0	0.75	ng/L		09/30/16 16:46	09/30/16 23:55	1
Perfluorooctanesulfonic acid (PFOS)	170		2.0	1.3	ng/L		09/30/16 16:46	09/30/16 23:55	1
Perfluorononanoic acid (PFNA)	83		2.0	0.65	ng/L		09/30/16 16:46	09/30/16 23:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	132		25 - 153				37/63/14 14:04	37/63/14 26:55	1
16C0-PFHpA	76		25 - 153				37/63/14 14:04	37/63/14 26:55	1
16C0 PFOA	77		25 - 153				37/63/14 14:04	37/63/14 26:55	1
16C0 PFOS	131		25 - 153				37/63/14 14:04	37/63/14 26:55	1
16C5 PFNA	77		25 - 153				37/63/14 14:04	37/63/14 26:55	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21927-1

Client Sample ID: 168424

Date Collected: 09/19/16 14:30

Date Received: 09/21/16 09:45

Lab Sample ID: 320-21927-4

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		09/30/16 16:46	10/01/16 00:32	1
Perfluorohexanesulfonic acid (PFHxS)	110		2.0	0.87	ng/L		09/30/16 16:46	10/01/16 00:32	1
Perfluoroheptanoic acid (PFHpA)	15		2.0	0.80	ng/L		09/30/16 16:46	10/01/16 00:32	1
Perfluorooctanoic acid (PFOA)	25		2.0	0.75	ng/L		09/30/16 16:46	10/01/16 00:32	1
Perfluorooctanesulfonic acid (PFOS)	140		2.0	1.3	ng/L		09/30/16 16:46	10/01/16 00:32	1
Perfluorononanoic acid (PFNA)	20		2.0	0.65	ng/L		09/30/16 16:46	10/01/16 00:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	87		25 - 153				37/63/14 14:04	13/31/14 33:62	1
16C0-PFHpa	86		25 - 153				37/63/14 14:04	13/31/14 33:62	1
16C0 PFOA	88		25 - 153				37/63/14 14:04	13/31/14 33:62	1
16C0 PFOS	72		25 - 153				37/63/14 14:04	13/31/14 33:62	1
16C5 PFNA	76		25 - 153				37/63/14 14:04	13/31/14 33:62	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-21927-1

Client Sample ID: 407429

Date Collected: 09/19/16 12:30

Date Received: 09/21/16 09:45

Lab Sample ID: 320-21927-5

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.6		2.0	0.92	ng/L		09/30/16 16:46	10/01/16 00:50	1
Perfluorohexanesulfonic acid (PFHxS)	67		2.0	0.87	ng/L		09/30/16 16:46	10/01/16 00:50	1
Perfluoroheptanoic acid (PFHpA)	6.6		2.0	0.80	ng/L		09/30/16 16:46	10/01/16 00:50	1
Perfluorooctanoic acid (PFOA)	31		2.0	0.75	ng/L		09/30/16 16:46	10/01/16 00:50	1
Perfluorooctanesulfonic acid (PFOS)	96		2.0	1.3	ng/L		09/30/16 16:46	10/01/16 00:50	1
Perfluorononanoic acid (PFNA)	150		2.0	0.65	ng/L		09/30/16 16:46	10/01/16 00:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	135		25 - 153				37/63/14 14:04	13/31/14 33:53	1
16C0-PFHpA	78		25 - 153				37/63/14 14:04	13/31/14 33:53	1
16C0 PFOA	75		25 - 153				37/63/14 14:04	13/31/14 33:53	1
16C0 PFOS	135		25 - 153				37/63/14 14:04	13/31/14 33:53	1
16C5 PFNA	77		25 - 153				37/63/14 14:04	13/31/14 33:53	1

TestAmerica Sacramento

Isotope Dilution Summary

Location: h&aSSoS WP inSoS
 Project: I itf oFkairbaSgs kire TraiSiS5 Area

TestAmerica Job ID: 320-2912C-9

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)
320-2912C-9	494671	906	1C	906	907	907
320-2912C-2	97867C	901	903	990	901	992
320-2912C-3	97C887	902	13	11	909	11
320-2912C-6	978626	81	83	88	12	13
320-2912C-4	60C621	904	18	14	904	11
M h 320-93098Q2-A	Mab I oStronhamLre	88	82	8C	12	10
M hD 320-93098Q3-A	Mab I oStronhamLre DpL	902	14	900	904	902
u B 320-93098Q9-A	u et&od BræSg	88	83	8C	10	81

Surrogate Legend

98O2 j k=Hh x 98O2 j k=Hh
 93I 6-j k=LA x 93I 6-j k=LA
 93I 6 j kOA x 93I 6 j kOA
 93I 6 j kOh x 93I 6 j kOh
 93I 4 j kNA x 93I 4 j kNA

QC Sample Results

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

TestAmerica Job ID: 320-2912C-9

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-130187/1-A

Matrix: Water

Analysis Batch: 130070

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 130187

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j erFidoroObdtaSesdrfoSic aci(B k) hN	. D		2L0	0L12	Suy7		01y80y96 96:46	01y80y96 22:23	9
j erFidoro&exaSesdrfoSic aci(B kHxhN	. D		2L0	0L8C	Suy7		01y80y96 96:46	01y80y96 22:23	9
j erFidoro&eptaSoic aci(B kHpAN	. D		2L0	0L80	Suy7		01y80y96 96:46	01y80y96 22:23	9
j erFidoroOctaSoic aci(B kOAN	. D		2L0	0LC5	Suy7		01y80y96 96:46	01y80y96 22:23	9
j erFidoroOctaSesdrfoSic aci(B kOhN	. D		2L0	9L3	Suy7		01y80y96 96:46	01y80y96 22:23	9
j erFidoroSoSaSoic aci(B k. AN	. D		2L0	0L65	Suy7		01y80y96 96:46	01y80y96 22:23	9

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	88		23 0135	5- 7 5716 164 6	5- 7 5716 2242/	1
1/ C: PFHpa	8/		23 0135	5- 7 5716 164 6	5- 7 5716 2242/	1
1/ C: PFOA	89		23 0135	5- 7 5716 164 6	5- 7 5716 2242/	1
1/ C: PFOS	- 5		23 0135	5- 7 5716 164 6	5- 7 5716 2242/	1
1/ C3 PFNA	8-		23 0135	5- 7 5716 164 6	5- 7 5716 2242/	1

Lab Sample ID: LCS 320-130187/2-A

Matrix: Water

Analysis Batch: 130070

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 130187

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
j erFidoroObdtaSesdrfoSic aci(B k) hN	9QC	20L4		Suy7		995	55 - 94C
j erFidoro&exaSesdrfoSic aci(B kHxhN	98L2	29LC		Suy7		991	58 - 938
j erFidoro&eptaSoic aci(B kHpAN	20L0	29L5		Suy7		90C	63 - 935
j erFidoroOctaSoic aci(B kOAN	20L0	23L6		Suy7		998	63 - 949
j erFidoroOctaSesdrfoSic aci(B kOhN	98L6	20LC		Suy7		992	4C- 962
j erFidoroSoSaSoic aci(B k. AN	20L0	22L1		Suy7		994	C9 - 940

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	88		23 0135
1/ C: PFHpa	82		23 0135
1/ C: PFOA	89		23 0135
1/ C: PFOS	- 2		23 0135
1/ C3 PFNA	- 5		23 0135

Lab Sample ID: LCSD 320-130187/3-A

Matrix: Water

Analysis Batch: 130070

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 130187

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
j erFidoroObdtaSesdrfoSic aci(B k) hN	9QC	96LC		Suy7		14	55 - 94C	20	30
j erFidoro&exaSesdrfoSic aci(B kHxhN	98L2	9Q1		Suy7		11	58 - 938	91	30
j erFidoro&eptaSoic aci(B kHpAN	20L0	9Q8		Suy7		81	63 - 935	98	30
j erFidoroOctaSoic aci(B kOAN	20L0	91L9		Suy7		16	63 - 949	29	30
j erFidoroOctaSesdrfoSic aci(B kOhN	98L6	9Q3		Suy7		13	4C- 962	98	30
j erFidoroSoSaSoic aci(B k. AN	20L0	91L8		Suy7		11	C9 - 940	95	30

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS WP iisoS

Project: hite: I itf oFkairbaSgs kire TraiSiSu Area

TestAmerica Job ID: 320-2912C-9

LCSD LCSD		
Isotope Dilution	%Recovery	Qualifier
18O2 PFHxS	152	23 0135
1/ C: PFHpA	- 3	23 0135
1/ C: PFOA	155	23 0135
1/ C: PFOS	153	23 0135
1/ C3 PFNA	152	23 0135

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

QC Association Summary

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

TestAmerica Job ID: 320-21927-1

LCMS

Analysis Batch: 130070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21927-1	515469	Total/NA	Water	PFAS	130187
320-21927-2	168467	Total/NA	Water	PFAS	130187
320-21927-3	167886	Total/NA	Water	PFAS	130187
320-21927-4	168424	Total/NA	Water	PFAS	130187
320-21927-5	407429	Total/NA	Water	PFAS	130187
MB 320-130187/1-A	Method Blank	Total/NA	Water	PFAS	130187
LCS 320-130187/2-A	Lab Control Sample	Total/NA	Water	PFAS	130187
LCSD 320-130187/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	130187

Prep Batch: 130187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-21927-1	515469	Total/NA	Water	PFAS Prep	
320-21927-2	168467	Total/NA	Water	PFAS Prep	
320-21927-3	167886	Total/NA	Water	PFAS Prep	
320-21927-4	168424	Total/NA	Water	PFAS Prep	
320-21927-5	407429	Total/NA	Water	PFAS Prep	
MB 320-130187/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-130187/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-130187/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Lab Chronicle

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

TestAmerica Job ID: 320-21426-1

Client Sample ID: 878249

Date Collecte6: - 9/79/74 74:80

Date Receive6: - 9/07/74 - 9:28

Lab Sample ID: 30- 10790M7

x atriW d ater

Prep Type	Batch Type	Batch x etho6	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare6 or Analyze6	Analyst	Lab
Total/NA	Prep	PFAS Prep			1 m7	1.99 m7	130186	04/30/19 19:L9	EPR	TA7 SAC
Total/NA	Analysis	PFAS		1			130060	04/30/19 23:18	S5V	TA7 SAC

Client Sample ID: 74524M

Date Collecte6: - 9/79/74 74:80

Date Receive6: - 9/07/74 - 9:28

Lab Sample ID: 30- 10790M0

x atriW d ater

Prep Type	Batch Type	Batch x etho6	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare6 or Analyze6	Analyst	Lab
Total/NA	Prep	PFAS Prep			1 m7	1.99 m7	130186	04/30/19 19:L9	EPR	TA7 SAC
Total/NA	Analysis	PFAS		1			130060	04/30/19 23:36	S5V	TA7 SAC

Client Sample ID: 74M54

Date Collecte6: - 9/79/74 78:0-

Date Receive6: - 9/07/74 - 9:28

Lab Sample ID: 30- 10790M3

x atriW d ater

Prep Type	Batch Type	Batch x etho6	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare6 or Analyze6	Analyst	Lab
Total/NA	Prep	PFAS Prep			1 m7	1.99 m7	130186	04/30/19 19:L9	EPR	TA7 SAC
Total/NA	Analysis	PFAS		1			130060	04/30/19 23:MM	S5V	TA7 SAC

Client Sample ID: 745202

Date Collecte6: - 9/79/74 72:3-

Date Receive6: - 9/07/74 - 9:28

Lab Sample ID: 30- 10790M2

x atriW d ater

Prep Type	Batch Type	Batch x etho6	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare6 or Analyze6	Analyst	Lab
Total/NA	Prep	PFAS Prep			1 m7	1.99 m7	130186	04/30/19 19:L9	EPR	TA7 SAC
Total/NA	Analysis	PFAS		1			130060	10/01/19 00:32	S5V	TA7 SAC

Client Sample ID: 2- M209

Date Collecte6: - 9/79/74 70:3-

Date Receive6: - 9/07/74 - 9:28

Lab Sample ID: 30- 10790M8

x atriW d ater

Prep Type	Batch Type	Batch x etho6	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepare6 or Analyze6	Analyst	Lab
Total/NA	Prep	PFAS Prep			1 m7	1.99 m7	130186	04/30/19 19:L9	EPR	TA7 SAC
Total/NA	Analysis	PFAS		1			130060	10/01/19 00:M0	S5V	TA7 SAC

Laboratory References:

TA7 SAC = TestAmerica Sacramento, 880 Viverside Parkway, West Sacramento, CA 4M00M T57 (419)363-M000

TestAmerica Sacramento

Certification Summary

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

TestAmerica Job ID: 320-24521-4

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 8LAP		2529-04	04-34-41
Alaska 7 ST(	State Program	40	7 ST-0UU	42-49-4)
Arizona	State Program	5	Az 0109	09-44-41
Arkansas D8Z	State Program	)	99-0) 54	0) -41-41
California	State Program	5	2951	04-34-49
Colorado	State Program	9	CA000QQ	09-34-41
Connecticut	State Program	4	PH-0) 54	0) -30-41
Florida	N8LAP	Q	891U10	0) -30-41
Hawaii	State Program	5	N/A	04-34-41
Illinois	N8LAP	U	2000) 0	03-41-41
Kansas	N8LAP	1	8-4031U	40-34-4)
Louisiana	N8LAP	)	30) 42	0) -30-41
Maine	State Program	4	CA000Q	0Q49-49
Michigan	State Program	U	55QI	04-34-49
Nevada	State Program	5	CA000QQ	01-34-41
New Jersey	N8LAP	2	CA00U	0) -30-41
New York	N8LAP	2	44)))	0Q04-41
Oregon	N8LAP	40	QQQ	04-25-41
Pennsylvania	N8LAP	3	) 9-04212	03-34-41
Texas	N8LAP	)	T40Q10QB55	01-34-41
7 S Fish & Wildlife	Federal		L84QB399-0	40-34-4)
7 SDA	Federal		P330-44-00QB)	42-30-41
7 S8PA 7 CMR	Federal	4	CA000QQ	44-0) -4)
7 tah	N8LAP	9	CA000QQ	02-29-41
Virginia	N8LAP	3	Q 0219	03-4Q41
Washington	State Program	40	CU94	0U0U41
West Virginia 8DW(	State Program	3	5530C	42-34-4)
Wyoming	State Program	9	9TMS-L	04-25-41

Method Summary

Client: Shannon & Wilson

TestAmerica Job ID: 320-21927-1

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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-21927-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-21927-1	515469	Water	09/19/16 16:52	09/21/16 09:45
320-21927-2	168467	Water	09/19/16 16:52	09/21/16 09:45
320-21927-3	167886	Water	09/19/16 15:20	09/21/16 09:45
320-21927-4	168424	Water	09/19/16 14:30	09/21/16 09:45
320-21927-5	407429	Water	09/19/16 12:30	09/21/16 09:45

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory Test America
Attn: David Altucker

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(206) 632-8020

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

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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	Total Number of Containers	Remarks/Matrix
515469		1052	9/19/16	X	2	2	GW
168467		1052	9/19/16	X	2	2	GW
167886		1520	9/19/16	X	2	2	GW
168424		1430	9/19/16	X	2	2	GW
407429		1230	9/19/16	X	2	2	GW



Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-1-11735-006</u>		Total Number of Containers: <u>10</u>		Signature: <u>M. Nadel</u> Time: <u>1100</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>COP Reg Fire Trajectory</u>		COC Seals/Intact? Y/N/NA		Printed Name: <u>Marcy Nadel</u> Date: <u>9/20/16</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>Hand</u>		Received By: 1. Signature: <u>Wesley Shockey</u> Time: <u>0943</u>		Received By: 2. Signature: _____ Time: _____		Received By: 3. Signature: _____ Time: _____	
Sampler: <u>JXG/MDN</u>		(attach shipping bill, if any)		Printed Name: <u>Wesley Shockey</u> Date: <u>9/20/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Instructions Requested Turnaround Time: <u>Standard</u> Special Instructions: <u>Please notify upon arrival</u>									
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File									

4.60° No. 34056

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-21927-1

Login Number: 21927

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:

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:

- 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:

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:

- 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.

- 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 observed that the samples 320-21927-1, 320-21927-2, 320-21927-3, 320-21927-A-2, and 320-21927-5, had an orange hue and contained dark colored suspended material.

The laboratory observed the presence of a dark brown sediment at the bottom of sample 320-21927-2.

The laboratory noted that there was insufficient sample volume to analyze matrix spike (MS) and matrix spike duplicate (MSD) samples.

The case narrative also included information relating to analytical batches not included with this WO (i.e., batches 320-128587 and 320-129758).

- 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 affect 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 level 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?

N/A; PFCs were not detected above the PQL in method blank MB 130187/1-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%.

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

Comments:

N/A; percent recoveries and RPDs were within acceptable limits. The maximum RPD reported was 21%.

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 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; see above.

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

Comments:

A trip blank was not required; see above.

- 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 with a frequency of 10% for the overall project.

ii. Submitted blind to lab?

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

A field duplicate pair was not submitted with this work order.

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.

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 work order, therefore 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 work order.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted with this work order.

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: 320-22485-1

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:

10/26/2016 5:08:12 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: 320-22485-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Case Narrative

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

TestAmerica Job ID: 320-22485-1

Job ID: 320-22485-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-22485-1

Receipt

The samples were received on 10/6/2016 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

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":

Method(s) PFAS: Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following sample: 169099 (320-22485-7). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

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 320-132047.

Method(s) PFAS Prep: The following samples are an orange color. 168017 (320-22485-1), 168025 (320-22485-2), 168033 (320-22485-3), 168726 (320-22485-4), 168254 (320-22485-5), 168354 (320-22485-6), 169099 (320-22485-7) and 515493-2 (320-22485-8)

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-133172.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-133617.

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

Detection Summary

Client: W & H P J i S
/ roectf&ite: n itF okgairbahus gire Traihid Area

TestAmerica Job ID: 320-2291C-I

Client Sample ID: 168017

Lab Sample ID: 320-22485-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	8L1		2L0	0L62	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVexahes(\$ohic aciB)/ gHx&.	39		2L0	0L1p	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVestahoiho aciB)/ gH5A.	22		2L0	0L10	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahoiho aciB)/ gOA.	38		2L0	0lpC	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	60		2L0	I L3	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orohohahoiho aciB)/ g4 A.	I 30		2L0	0L8C	hdf7			I	/ gA&	Total \$4 A

Client Sample ID: 168025

Lab Sample ID: 320-22485-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	3L6		2L0	0L62	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVexahes(\$ohic aciB)/ gHx&.	28		2L0	0L1p	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVestahoiho aciB)/ gH5A.	I 6		2L0	0L10	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahoiho aciB)/ gOA.	38		2L0	0lpC	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	93		2L0	I L3	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orohohahoiho aciB)/ g4 A.	200		2L0	0L8C	hdf7			I	/ gA&	Total \$4 A

Client Sample ID: 168033

Lab Sample ID: 320-22485-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	Q12		2L0	0L62	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVexahes(\$ohic aciB)/ gHx&.	26		2L0	0L1p	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVestahoiho aciB)/ gH5A.	20		2L0	0L10	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahoiho aciB)/ gOA.	36		2L0	0lpC	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	31		2L0	I L3	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orohohahoiho aciB)/ g4 A.	220		2L0	0L8C	hdf7			I	/ gA&	Total \$4 A

Client Sample ID: 168726

Lab Sample ID: 320-22485-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	9lp		2L0	0L62	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVexahes(\$ohic aciB)/ gHx&.	23		2L0	0L1p	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVestahoiho aciB)/ gH5A.	2L9		2L0	0L10	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahoiho aciB)/ gOA.	8LC		2L0	0lpC	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	C9		2L0	I L3	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orohohahoiho aciB)/ g4 A.	pL0		2L0	0L8C	hdf7			I	/ gA&	Total \$4 A

Client Sample ID: 168254

Lab Sample ID: 320-22485-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	9L0		2L0	0L62	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVexahes(\$ohic aciB)/ gHx&.	2p		2L0	0L1p	hdf7			I	/ gA&	Total \$4 A
/ erk\$ oroVestahoiho aciB)/ gH5A.	I p		2L0	0L10	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahoiho aciB)/ gOA.	39		2L0	0lpC	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	C9		2L0	I L3	hdf7			I	/ gA&	Total \$4 A
/ erk\$ orohohahoiho aciB)/ g4 A.	2L 0		2L0	0L8C	hdf7			I	/ gA&	Total \$4 A

Client Sample ID: 168354

Lab Sample ID: 320-22485-6

TVs Detection & (mmarF Boes hot ihc\$ Be raBiocVemicaTest res(\$SL

TestAmerica &acramehto

Detection Summary

Site: Waihihoh P j iSoh
Project: n itF okgairbahus gire Traihhd Area

TestAmerica Job ID: 320-2291C-I

Client Sample ID: 168354 (Continued)

Lab Sample ID: 320-22485-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	3lp		2l0	0l62	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ oroVexahes(\$ohic aciB)/ gHx&.	2C		2l0	0l1p	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ oroVestahoi(aciB)/ gH5A.	l p		2l0	0l10	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orooctahoi(aciB)/ gOA.	32		2l0	0lpC	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	00		2l0	l l3	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orohohahoi(aciB)/ g4 A.	200		2l0	0l8C	hdf7	l		/ gA&	Tota\$4 A

Client Sample ID: 169099

Lab Sample ID: 320-22485-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	3lp		2l0	0l62	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ oroVexahes(\$ohic aciB)/ gHx&.	l 20		2l0	0l1p	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ oroVestahoi(aciB)/ gH5A.	32		2l0	0l10	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orooctahoi(aciB)/ gOA.	10		2l0	0lpC	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	69		2l0	l l3	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orohohahoi(aciB)/ g4 A. - D7	Q 0		20	8lC	hdf7	l 0		/ gA&	Tota\$4 A

Client Sample ID: 515493-2

Lab Sample ID: 320-22485-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	l lp J		2l0	0l62	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ oroVexahes(\$ohic aciB)/ gHx&.	l l		2l0	0l1p	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ oroVestahoi(aciB)/ gH5A.	1lp		2l0	0l10	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orooctahoi(aciB)/ gOA.	l 2		2l0	0lpC	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	22		2l0	l l3	hdf7	l		/ gA&	Tota\$4 A
/ erk\$ orohohahoi(aciB)/ g4 A.	2l		2l0	0l8C	hdf7	l		/ gA&	Tota\$4 A

Client Sample Results

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 84908M

Date Collected: 80/03/84 87:84

Date Received: 80/0M84 0h:17

Lab Sample ID: 320-22197-8

retrieved at

Substances

Substance	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil	Fac
Hexachlorobutanesulfonide	42		2.0	0.92	ng/L		10/18/16 13:21	10/18/16 19:38	1	
Hexachlorocyclopentadiene	31		2.0	0.87	ng/L		10/18/16 13:21	10/18/16 19:38	1	
Hexachlorocyclopentadiene	22		2.0	0.80	ng/L		10/18/16 13:21	10/18/16 19:38	1	
Hexachlorocyclopentadiene	34		2.0	0.75	ng/L		10/18/16 13:21	10/18/16 19:38	1	
Hexachlorocyclopentadiene	h0		2.0	1.3	ng/L		10/18/16 13:21	10/18/16 19:38	1	
Hexachlorocyclopentadiene	830		2.0	0.65	ng/L		10/18/16 13:21	10/18/16 19:38	1	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac
18O2 PFHxS	124		25 - 150	10/18/16 13:21	10/18/16 19:38	1	
13C4-PFHxS	134		25 - 150	10/18/16 13:21	10/18/16 19:38	1	
13C4 PFOA	134		25 - 150	10/18/16 13:21	10/18/16 19:38	1	
13C4 PFOS	122		25 - 150	10/18/16 13:21	10/18/16 19:38	1	
13C5 PFNA	135		25 - 150	10/18/16 13:21	10/18/16 19:38	1	

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 849027

Date Collected: 80/03/84 84:8M

Date Received: 80/0M84 0h:17

Lab Sample ID: 320-22197-2

retrieved at

Substances

Substance	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil	Fac
Hexachlorobutanesulfonide	3h		2.0	0.92	ng/L		10/18/16 13:21	10/18/16 19:56	1	
Hexachlorocyclopentadiene	24		2.0	0.87	ng/L		10/18/16 13:21	10/18/16 19:56	1	
Hexachlorocyclopentadiene	8h		2.0	0.80	ng/L		10/18/16 13:21	10/18/16 19:56	1	
Hexachlorocyclopentadiene	34		2.0	0.75	ng/L		10/18/16 13:21	10/18/16 19:56	1	
Hexachlorocyclopentadiene	13		2.0	1.3	ng/L		10/18/16 13:21	10/18/16 19:56	1	
Hexachlorocyclopentadiene	200		2.0	0.65	ng/L		10/18/16 13:21	10/18/16 19:56	1	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac
18O2 PFHxS	123		25 - 150	10/18/16 13:21	10/18/16 19:56	1	
13C4-PFHxS	130		25 - 150	10/18/16 13:21	10/18/16 19:56	1	
13C4 PFOA	129		25 - 150	10/18/16 13:21	10/18/16 19:56	1	
13C4 PFOS	122		25 - 150	10/18/16 13:21	10/18/16 19:56	1	
13C5 PFNA	130		25 - 150	10/18/16 13:21	10/18/16 19:56	1	

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 849033

Date Collected: 80/03/84 84:39

Date Received: 80/0M84 0h:17

Lab Sample ID: 320-22197-3

retrieved at

Substances

Substance	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil	Fac
Hexachlorobutanesulfonide	72		2.0	0.92	ng/L		10/18/16 13:21	10/18/16 20:15	1	
Hexachlorocyclopentadiene	2h		2.0	0.87	ng/L		10/18/16 13:21	10/18/16 20:15	1	
Hexachlorocyclopentadiene	20		2.0	0.80	ng/L		10/18/16 13:21	10/18/16 20:15	1	
Hexachlorocyclopentadiene	3h		2.0	0.75	ng/L		10/18/16 13:21	10/18/16 20:15	1	
Hexachlorocyclopentadiene	39		2.0	1.3	ng/L		10/18/16 13:21	10/18/16 20:15	1	
Hexachlorocyclopentadiene	220		2.0	0.65	ng/L		10/18/16 13:21	10/18/16 20:15	1	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac
18O2 PFHxS	120		25 - 150	10/18/16 13:21	10/18/16 20:15	1	
13C4-PFHxS	127		25 - 150	10/18/16 13:21	10/18/16 20:15	1	
13C4 PFOA	131		25 - 150	10/18/16 13:21	10/18/16 20:15	1	
13C4 PFOS	121		25 - 150	10/18/16 13:21	10/18/16 20:15	1	
13C5 PFNA	127		25 - 150	10/18/16 13:21	10/18/16 20:15	1	

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 849M24

Date Collected: 80/03/84 89:04

Date Received: 80/0M84 0h:17

Lab Sample ID: 320-22197-1

retrieved at

Substances

Substance	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dilution
Hexachlorobutanesulfonic acid (HCB) S.	12		2.0	0.92	ng/L		10/18/16 13:21	10/18/16 20:51	1
Hexachloropentanesulfonic acid (HCP) S.	23		2.0	0.87	ng/L		10/18/16 13:21	10/18/16 20:51	1
Hexachloroheptanesulfonic acid (HCH) S.	21		2.0	0.80	ng/L		10/18/16 13:21	10/18/16 20:51	1
Hexachlorooctanesulfonic acid (HCO) S.	47		2.0	0.75	ng/L		10/18/16 13:21	10/18/16 20:51	1
Hexachlorodecane sulfonic acid (HCD) S.	71		2.0	1.3	ng/L		10/18/16 13:21	10/18/16 20:51	1
Hexachlorododecane sulfonic acid (HDD) S.	10		2.0	0.65	ng/L		10/18/16 13:21	10/18/16 20:51	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dilution
18O2 PFHxS	119		25 - 150	10/18/16 13:21	10/18/16 20:51	1
13C4-PFHxS	129		25 - 150	10/18/16 13:21	10/18/16 20:51	1
13C4 PFOA	131		25 - 150	10/18/16 13:21	10/18/16 20:51	1
13C4 PFOS	121		25 - 150	10/18/16 13:21	10/18/16 20:51	1
13C5 PFNA	130		25 - 150	10/18/16 13:21	10/18/16 20:51	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 849271

Date Collected: 80/03/84 89:10

Date Received: 80/0M84 0h:17

Lab Sample ID: 320-22197-7

re-attempted

Perfluorinated Alkyl Substances

Compound Name	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dilution
Perfluorobutanesulfonic acid (PFBS)	120		2.0	0.92	ng/L		10/18/16 13:21	10/18/16 21:10	1
Perfluoropentanesulfonic acid (PFPeS)	2M		2.0	0.87	ng/L		10/18/16 13:21	10/18/16 21:10	1
Perfluorooctanesulfonic acid (PFOS)	8M		2.0	0.80	ng/L		10/18/16 13:21	10/18/16 21:10	1
Perfluorodecane sulfonic acid (PFDS)	31		2.0	0.75	ng/L		10/18/16 13:21	10/18/16 21:10	1
Perfluorododecane sulfonic acid (PFDDoS)	71		2.0	1.3	ng/L		10/18/16 13:21	10/18/16 21:10	1
Perfluorotridecane sulfonic acid (PFTrDS)	280		2.0	0.65	ng/L		10/18/16 13:21	10/18/16 21:10	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dilution
¹⁸ O ₂ PFHxS	115		25 - 150	10/18/16 13:21	10/18/16 21:10	1
¹³ C ₄ -PFHpA	125		25 - 150	10/18/16 13:21	10/18/16 21:10	1
¹³ C ₄ PFOA	126		25 - 150	10/18/16 13:21	10/18/16 21:10	1
¹³ C ₄ PFOS	116		25 - 150	10/18/16 13:21	10/18/16 21:10	1
¹³ C ₅ PFNA	123		25 - 150	10/18/16 13:21	10/18/16 21:10	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 849371

Date Collected: 80/03/84 89:17

Date Received: 80/0M84 0h:17

Lab Sample ID: 320-22197-4

retrieved at

Substances

Substance	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dilution
Hexachlorobutanesulfonamide	32	M	2.0	0.92	ng/L		10/18/16 13:21	10/18/16 21:28	1
Hexachlorocyclopentadiene	27		2.0	0.87	ng/L		10/18/16 13:21	10/18/16 21:28	1
Hexachlorocyclopentadiene	8	M	2.0	0.80	ng/L		10/18/16 13:21	10/18/16 21:28	1
Hexachlorocyclopentadiene	32		2.0	0.75	ng/L		10/18/16 13:21	10/18/16 21:28	1
Hexachlorocyclopentadiene	70		2.0	1.3	ng/L		10/18/16 13:21	10/18/16 21:28	1
Hexachlorocyclopentadiene	200		2.0	0.65	ng/L		10/18/16 13:21	10/18/16 21:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dilution
18O2 PFHxS	119		25 - 150	10/18/16 13:21	10/18/16 21:28	1
13C4-PFHxS	127		25 - 150	10/18/16 13:21	10/18/16 21:28	1
13C4 PFOA	133		25 - 150	10/18/16 13:21	10/18/16 21:28	1
13C4 PFOS	119		25 - 150	10/18/16 13:21	10/18/16 21:28	1
13C5 PFNA	130		25 - 150	10/18/16 13:21	10/18/16 21:28	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 84h0hh

Date Collected: 80/01/84 82:83

Date Received: 80/0M84 0h:17

Lab Sample ID: 320-22197-M

atxW o atex

retPc6: Faf S - FexMucxinate6 f ly(I Substandes

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(Ue6	Dil Aad
FexMucxibutanesulknid adi6	32M		2.0	0.92	ng/L		10/18/16 13:21	10/18/16 21:46	1
FA) S.									
FexMucxPeWanesulknid adi6	820		2.0	0.87	ng/L		10/18/16 13:21	10/18/16 21:46	1
FAOV6.									
FexMucxPeptancid adi6 FAOpf .	32		2.0	0.80	ng/L		10/18/16 13:21	10/18/16 21:46	1
FexMucxcdtancid adi6 FA5 f .	90		2.0	0.75	ng/L		10/18/16 13:21	10/18/16 21:46	1
FexMucxcdtanesulknid adi6	h1		2.0	1.3	ng/L		10/18/16 13:21	10/18/16 21:46	1
FA5 S.									

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	116		25 - 150	10/18/16 13:21	10/18/16 21:46	1
13C4-PFHpA	123		25 - 150	10/18/16 13:21	10/18/16 21:46	1
13C4 PFOA	130		25 - 150	10/18/16 13:21	10/18/16 21:46	1
13C4 PFOS	113		25 - 150	10/18/16 13:21	10/18/16 21:46	1

retPc6: Faf S - FexMucxinate6 f ly(I Substandes - DL

f nal(te	Result	Hualikex	RL	r DL	Qnit	D	Fxepax6	f nal(Ue6	Dil Aad
FexMucxcncnancid adi6 FAJ f .	780		20	6.5	ng/L		10/11/16 16:09	10/13/16 17:29	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	150		25 - 150	10/11/16 16:09	10/13/16 17:29	10
13C4-PFHpA	171	*	25 - 150	10/11/16 16:09	10/13/16 17:29	10
13C4 PFOA	168	*	25 - 150	10/11/16 16:09	10/13/16 17:29	10
13C4 PFOS	149		25 - 150	10/11/16 16:09	10/13/16 17:29	10
13C5 PFNA	162	*	25 - 150	10/11/16 16:09	10/13/16 17:29	10

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 7871h3-2

Date Collected: 80/01/84 81:38

Date Received: 80/0M84 0h:17

Lab Sample ID: 320-22197-9

retrieved at

Perfluorinated Substances

Compound Name	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil	Fac
Perfluorobutanesulfonic acid (PFBS)	82	N	2.0	0.92	ng/L		10/11/16 16:09	10/12/16 18:51	1	
Perfluoropentanesulfonic acid (PFPeS)	88		2.0	0.87	ng/L		10/11/16 16:09	10/12/16 18:51	1	
Perfluorooctanesulfonic acid (PFOS)	92	M	2.0	0.80	ng/L		10/11/16 16:09	10/12/16 18:51	1	
Perfluorodecane sulfonic acid (PFDS)	82		2.0	0.75	ng/L		10/11/16 16:09	10/12/16 18:51	1	
Perfluorododecane sulfonic acid (PFDDoS)	22		2.0	1.3	ng/L		10/11/16 16:09	10/12/16 18:51	1	
Perfluorotridecane sulfonic acid (PFTrDS)	28		2.0	0.65	ng/L		10/11/16 16:09	10/12/16 18:51	1	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac
18O2 PFHxS	139		25 - 150	10/11/16 16:09	10/12/16 18:51	1	
13C4-PFHxA	148		25 - 150	10/11/16 16:09	10/12/16 18:51	1	
13C4 PFOA	144		25 - 150	10/11/16 16:09	10/12/16 18:51	1	
13C4 PFOS	137		25 - 150	10/11/16 16:09	10/12/16 18:51	1	
13C5 PFNA	139		25 - 150	10/11/16 16:09	10/12/16 18:51	1	

Isotope Dilution Summary

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

TestAmerica Job ID: 320-22485-1

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 _A (25-150)	¹³ C ₄ PFO _S (25-150)	¹³ C ₅ PFNA (25-150)
320-22485-1	168017	124	134	134	122	135
320-22485-2	168025	123	130	129	122	130
320-22485-3	168033	120	127	131	121	127
320-22485-4	168726	119	129	131	121	130
320-22485-5	168254	115	125	126	116	123
320-22485-6	168354	119	127	133	119	130
320-22485-7 - DL	169099	150	171 *	168 *	149	162 *
320-22485-7	169099	116	123	130	113	
320-22485-8	515493-2	139	148	144	137	139
LCS 320-133172/2-A	Lab Control Sample	124	131	131	122	127
LCSD 320-133172/3-A	Lab Control Sample Dup	125	132	131	124	129
MB 320-133172/1-A	Method Blank	122	137	134	123	128

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

Site: Waihihoh P j iSoh
/ roject&ite: n itF okgairbahus gire Traihid Area

TestAmerica Job ID: 320-2291C-I

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-1331827-A

Matri4: / ater

Analysis Batch: 1332TN

Client Sample ID: Method Blank

Prep xype: xotal7WA

Prep Batch: 133182

Analyte	Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	LD		270	072	hdf4		I Ofi 1fl 8 | 3:2l	I Ofi 1fl 8 | x:26	I
/ erk\$ oroVeHahes(\$ohic aciB)/ gpH&.	LD		270	07x	hdf4		I Ofi 1fl 8 | 3:2l	I Ofi 1fl 8 | x:26	I
/ erk\$ oroVe5tahoic aciB)/ gp 5A.	LD		270	070	hdf4		I Ofi 1fl 8 | 3:2l	I Ofi 1fl 8 | x:26	I
/ erk\$ orooctahoic aciB)/ gOA.	LD		270	07C	hdf4		I Ofi 1fl 8 | 3:2l	I Ofi 1fl 8 | x:26	I
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	LD		270	1 73	hdf4		I Ofi 1fl 8 | 3:2l	I Ofi 1fl 8 | x:26	I
/ erk\$ orohohahoic aciB)/ gL A.	LD		270	07C	hdf4		I Ofi 1fl 8 | 3:2l	I Ofi 1fl 8 | x:26	I

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	122		23 0135	15-18-17 1: 21	15-18-17 1/ 24	1
1: Cp PFHA9	1: /		23 0135	15-18-17 1: 21	15-18-17 1/ 24	1
1: Cp PFO9	1: p		23 0135	15-18-17 1: 21	15-18-17 1/ 24	1
1: Cp PFOS	12:		23 0135	15-18-17 1: 21	15-18-17 1/ 24	1
1: C3 PFN9	128		23 0135	15-18-17 1: 21	15-18-17 1/ 24	1

Lab Sample ID: LCS 320-1331827-A

Matri4: / ater

Analysis Batch: 1332TN

Client Sample ID: Lab Control Sample

Prep xype: xotal7WA

Prep Batch: 133182

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	1 x7x	1 679		hdf4		110	CC-1 9x
/ erk\$ oroVeHahes(\$ohic aciB)/ gpH&.	1 172	21 70		hdf4		11 C	C1 -1 31
/ erk\$ oroVe5tahoic aciB)/ gp 5A.	2070	2373		hdf4		11 8	83 -1 3C
/ erk\$ orooctahoic aciB)/ gOA.	2070	2978		hdf4		1 23	83 -1 9l
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	1 178	2073		hdf4		1 06	9x -1 82
/ erk\$ orohohahoic aciB)/ gL A.	2070	297C		hdf4		1 23	x1 -1 90

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	12p		23 0135
1: Cp PFHA9	1: 1		23 0135
1: Cp PFO9	1: 1		23 0135
1: Cp PFOS	122		23 0135
1: C3 PFN9	12/		23 0135

Lab Sample ID: LCSD 320-1331827-A

Matri4: / ater

Analysis Batch: 1332TN

Client Sample ID: Lab Control Sample Dup

Prep xype: xotal7WA

Prep Batch: 133182

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
/ erk\$ orob(tahes(\$ohic aciB)/ gN&.	1 x7x	1 67		hdf4		1 01	CC-1 9x	2	30
/ erk\$ oroVeHahes(\$ohic aciB)/ gpH&.	1 172	21 7		hdf4		11 8	C1 -1 31	0	30
/ erk\$ oroVe5tahoic aciB)/ gp 5A.	2070	237		hdf4		11 C	83 -1 3C	1	30
/ erk\$ orooctahoic aciB)/ gOA.	2070	2978		hdf4		1 23	83 -1 9l	0	30
/ erk\$ orooctahes(\$ohic aciB)/ gO&.	1 178	1 672		hdf4		1 09	9x -1 82	8	30
/ erk\$ orohohahoic aciB)/ gL A.	2070	297		hdf4		1 20	x1 -1 90	2	30

TestAmerica &acramehto

QC Sample Results

Site: &Whhoh P j iSoh

/ rojectf&ite: n itF okgairbahus gire Traihid Area

TestAmerica Job ID: 320-2291C-I

LCSD LCSD		
Isotope Dilution	%Recovery	Qualifier Limits
18O2 PFHxS	123	23 0135
1: Cp PFHA9	1: 2	23 0135
1: Cp PFO9	1: 1	23 0135
1: Cp PFOS	12p	23 0135
1: C3 PFN9	124	23 0135

QC Association Summary

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

TestAmerica Job ID: 320-22485-1

LCMS

Prep Batch: 132047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22485-7 - DL	169099	Total/NA	Water	PFAS Prep	
320-22485-8	515493-2	Total/NA	Water	PFAS Prep	

Analysis Batch: 132394

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22485-8	515493-2	Total/NA	Water	PFAS	132047

Analysis Batch: 132396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22485-7 - DL	169099	Total/NA	Water	PFAS	132047

Prep Batch: 133172

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22485-1	168017	Total/NA	Water	PFAS Prep	
320-22485-2	168025	Total/NA	Water	PFAS Prep	
320-22485-3	168033	Total/NA	Water	PFAS Prep	
320-22485-4	168726	Total/NA	Water	PFAS Prep	
320-22485-5	168254	Total/NA	Water	PFAS Prep	
320-22485-6	168354	Total/NA	Water	PFAS Prep	
320-22485-7	169099	Total/NA	Water	PFAS Prep	
MB 320-133172/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-133172/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-133172/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 133248

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22485-1	168017	Total/NA	Water	PFAS	133172
320-22485-2	168025	Total/NA	Water	PFAS	133172
320-22485-3	168033	Total/NA	Water	PFAS	133172
320-22485-4	168726	Total/NA	Water	PFAS	133172
320-22485-5	168254	Total/NA	Water	PFAS	133172
320-22485-6	168354	Total/NA	Water	PFAS	133172
320-22485-7	169099	Total/NA	Water	PFAS	133172
MB 320-133172/1-A	Method Blank	Total/NA	Water	PFAS	133172
LCS 320-133172/2-A	Lab Control Sample	Total/NA	Water	PFAS	133172
LCSD 320-133172/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	133172

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 872489

Date Collecte6: 84/43/87 8M87

Date Receive6: 84/49/87 4T:1M

Lab Sample ID: 304-0012M8

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	133172	10/18/16 13:21	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			133248	10/18/16 19:38	CBW	TAL SAC

Client Sample ID: 87240M

Date Collecte6: 84/43/87 87:89

Date Receive6: 84/49/87 4T:1M

Lab Sample ID: 304-0012M0

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	133172	10/18/16 13:21	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			133248	10/18/16 19:56	CBW	TAL SAC

Client Sample ID: 872433

Date Collecte6: 84/43/87 87:32

Date Receive6: 84/49/87 4T:1M

Lab Sample ID: 304-0012M3

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	133172	10/18/16 13:21	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			133248	10/18/16 20:15	CBW	TAL SAC

Client Sample ID: 872907

Date Collecte6: 84/43/87 82:47

Date Receive6: 84/49/87 4T:1M

Lab Sample ID: 304-0012M1

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	133172	10/18/16 13:21	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			133248	10/18/16 20:51	CBW	TAL SAC

Client Sample ID: 8720M

Date Collecte6: 84/43/87 82:14

Date Receive6: 84/49/87 4T:1M

Lab Sample ID: 304-0012MM

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	133172	10/18/16 13:21	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			133248	10/18/16 21:10	CBW	TAL SAC

Client Sample ID: 8723M

Date Collecte6: 84/43/87 82:1M

Date Receive6: 84/49/87 4T:1M

Lab Sample ID: 304-0012M7

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	133172	10/18/16 13:21	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			133248	10/18/16 21:28	CBW	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-22485-1

Client Sample ID: 87T4TT

Date Collecte6: 84/41/87 80:83

Date Receive6: 84/49/87 4T:1M

Lab Sample ID: 304-0012M9

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial smoz nt	Ninal smoz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep	DL		1 mL	1.66 mL	132047	10/11/16 16:09	VPM	TAL SAC
Total/NA	Analysis	PFAS	DL	10			132396	10/13/16 17:29	CBW	TAL SAC
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	133172	10/18/16 13:21	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			133248	10/18/16 21:46	CBW	TAL SAC

Client Sample ID: MBMT3-0

Date Collecte6: 84/41/87 81:38

Date Receive6: 84/49/87 4T:1M

Lab Sample ID: 304-0012M2

x atriW d ater

Arep yBpe	Patch yBpe	Patch x etho6	Rzn	Dil Nactor	Initial smoz nt	Ninal smoz nt	Patch 5z mber	Arep are6 or s nalBFe6	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1 mL	1.66 mL	132047	10/11/16 16:09	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			132394	10/12/16 18:51	CBW	TAL SAC

LaboratorB Referenceu:

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

Certification Summary

Client: Shannon & Wilson

TestAmerica Job ID: 320-2291P-j

/ rojectSite: CitF okgairbands gire Trainin. Area

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed below. All certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2EA	DoD (EA/		2721-0j	0j -3j -j U
Alaska)5 ST6	State / ro. ram	j 0	5 ST-0PP	j 2-j 1-j z
Arizona	State / ro. ram	7	A* 0U01	01-j j -j U
Arkansas D(Q	State / ro. ram	z	11-0z7j	0z-j U-j U
California	State / ro. ram	7	217U	0j -3j -j 1
Colorado	State / ro. ram	1	CA00099	01-3j -j U
Connecticut	State / ro. ram	j	/ u -0z7j	0z-30-j U
Florida	L (EA/	9	(1UPU0	0z-30-j U
Hawaii	State / ro. ram	7	L fA	0j -3j -j U
Illinois	L (EA/	P	2000z0	03-j U-j U
Iowa	L (EA/	U	(-j 03UP	j 0-3j -j z K
Louisiana	L (EA/	z	30zj 2	0z-30-j U
Maine	State / ro. ram	j	CA0009	09-j 1-j 1
Michigan	State / ro. ram	P	779U	0j -3j -j 1
Minnesota	State / ro. ram	7	CA00099	0U-3j -j U
New Jersey	L (EA/	2	CA00P	0z-30-j U
New York	L (EA/	2	j j zzz	09-0j -j U
Oregon	L (EA/	j 0	9090	0j -27-j U
Pennsylvania	L (EA/	3	z1-0j 2U2	03-3j -j U
Texas	L (EA/	z	Tj 09U09377	0U-3j -j U
US Fish & Wildlife	geNeral		E(j 91311-0	j 0-3j -j z
USDA	geNeral		/ 330-j j -0093z	j 2-30-j U
US Fish & Wildlife	geNeral	j	CA00099	j j -0z-j z
Utah	L (EA/	1	CA00099	02-21-j U
Virginia	L (EA/	3	9z02U1	03-j 9-j U
Washington	State / ro. ram	j 0	CP1j	0P-0P-j U
West Virginia)DW6	State / ro. ram	3	7730C	j 2-3j -j z
Wisconsin	State / ro. ram	1	1TMS-E	0j -27-j U

Method Summary

LineSt: h&aSSoS WP iisoS
j ro/ectyhite: I itf oFkairbaSgs kire TraiSiSL Area

TestAmerica Job ID: 320-22451-C

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

Protocol References:

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

Laboratory References:

TAu hAl , TestAmerica hacrameStoC550 Riversi=e j argwaf CP est hacrameStoC A 91601OTEu (906)373-1600

Sample Summary

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

TestAmerica Job ID: 320-22485-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-22485-1	168017	Water	10/03/16 15:16	10/07/16 09:45
320-22485-2	168025	Water	10/03/16 16:17	10/07/16 09:45
320-22485-3	168033	Water	10/03/16 16:38	10/07/16 09:45
320-22485-4	168726	Water	10/03/16 18:06	10/07/16 09:45
320-22485-5	168254	Water	10/03/16 18:40	10/07/16 09:45
320-22485-6	168354	Water	10/03/16 18:45	10/07/16 09:45
320-22485-7	169099	Water	10/04/16 12:13	10/07/16 09:45
320-22485-8	515493-2	Water	10/04/16 14:31	10/07/16 09:45



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Fairbanks, AK 99709
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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

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory TEST America
Attn: David Altmeppen

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

2355 Hill Road

Fairbanks, AK 99709

(907) 479-0600

2255 S.W. Canyon Road

Portland, OR 97201-2498

(503) 223-6147

5430 Fairbanks Street, Suite 3

Anchorage, AK 99518

(907) 561-2120

1321 Bannock Street, Suite 200

Denver, CO 80204

(303) 825-3800

Sample Identity

Lab No.

Time

Date Sampled

Comp.

Grab

X6 LHM

PES (455-11-0015)

</



320-22485 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>31-11735-006</u>		Total Number of Containers: <u>16</u>		Signature: <u>M. Nadel</u> Time: <u>1050</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>COF Regional Fire</u>		COC Seals/Intact? Y/N/NA		Printed Name: <u>Mary Nadel</u> Date: <u>10/5/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>Mary Nadel</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>Fed Ex</u>							
Sampler: <u>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>Wesley Shockey</u> Time: <u>0945</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Special Instructions: <u>Please notify upon arrival</u>				Printed Name: <u>Wesley Shockey</u> Date: <u>10/6/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
				Company: <u>Shannon & Wilson</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

3.4°C

No. 34209



Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-22485-1

Login Number: 22485

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:

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:

- 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:

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:

- 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.

- 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:

Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for sample 169099. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

The laboratory observed an orange color in each of the eight water samples.

The laboratory noted that there was insufficient sample volume to analyze matrix spike (MS) and matrix spike duplicate (MSD) samples.

- 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 level 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:

N/A; PFCs were not detected in MB 133172/1-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 6%.

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

Comments:

N/A; 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 are within the laboratory limits of 25% to 150% with one exception. Surrogate recovery associated with the PFNA result for sample 169099 exceeded laboratory limits. However, PFNA was analyzed at a 10-fold dilution for this sample.

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 PFNA result for sample 169099 is not flagged because this sample was analyzed at a 10-fold dilution. Recovery failures observed due to 'diluting out' of surrogates are not considered to affect the data.

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:

The field duplicate pair 168254 / 168354 was 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:

Yes, RPDs for this field duplicate pair are below 10%.

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.

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 work order, therefore 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 work order.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted with this work order.

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: 320-22913-1

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:

10/31/2016 1:01:53 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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-22913-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.

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: 320-22913-1

Job ID: 320-22913-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-22913-1

Receipt

The samples were received on 10/21/2016 9:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 6.2° C.

Samples 87173, 81765, and 87157 were deactivated by client on 10/26/16.

LCMS

Method(s) PFAS: Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following sample: 669077 (320-22913-5). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method(s) PFAS: The following 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": 92924 (320-22913-1), 87301 (320-22913-3), 167754 (320-22913-4), 669077 (320-22913-5), 87408 (320-22913-6), 127124 (320-22913-8), 87319 (320-22913-9), MW-507 (320-22913-10), EB-507 (320-22913-11), (CCV 320-135146/12), (CCV 320-135146/23), (CCV 320-135146/34), (LCS 320-134805/2-A), (LCSD 320-134805/3-A) and (MB 320-134805/1-A)

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 320-134805.

Method(s) PFAS Prep: The following samples are orange, and they also contain some dark orange residue on the bottom. 92924 (320-22913-1), 167754 (320-22913-4), 669077 (320-22913-5), 87408 (320-22913-6), 87319 (320-22913-9) and MW-507 (320-22913-10)

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: 320-22913-1

Client Sample ID: 92924

Lab Sample ID: 320-22913-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	5.1		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: 87301

Lab Sample ID: 320-22913-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.1		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: 167754

Lab Sample ID: 320-22913-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	8.6		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	40		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 669077

Lab Sample ID: 320-22913-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.8		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: 87408

Lab Sample ID: 320-22913-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	5.2		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	30		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 127124

Lab Sample ID: 320-22913-8

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)	27		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 87319

Lab Sample ID: 320-22913-9

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)	19		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: MW-507

Lab Sample ID: 320-22913-10

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)	160		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: EB-507

Lab Sample ID: 320-22913-11

No Detections.

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: 320-22913-1

Client Sample ID: 92924

Date Collected: 10/17/16 10:10

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	5.1		2.0	0.75	ng/L		10/27/16 13:17	10/29/16 13:35	1
Perfluorooctanesulfonic acid (PFOS)	26		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 13:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	148		25 - 150				10/27/16 13:17	10/29/16 13:35	1
13C4 PFOS	132		25 - 150				10/27/16 13:17	10/29/16 13:35	1

Client Sample Results

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

TestAmerica Job ID: 320-22913-1

Client Sample ID: 87301

Date Collected: 10/17/16 13:21

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-3

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.1		2.0	0.75	ng/L		10/27/16 13:17	10/29/16 13:54	1
Perfluorooctanesulfonic acid (PFOS)	20		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 13:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	149		25 - 150				10/27/16 13:17	10/29/16 13:54	1
13C4 PFOS	133		25 - 150				10/27/16 13:17	10/29/16 13:54	1

Client Sample Results

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

TestAmerica Job ID: 320-22913-1

Client Sample ID: 167754

Date Collected: 10/17/16 14:34

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-4

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	8.6		2.0	0.75	ng/L		10/27/16 13:17	10/29/16 14:12	1
Perfluorooctanesulfonic acid (PFOS)	40		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 14:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	147		25 - 150				10/27/16 13:17	10/29/16 14:12	1
13C4 PFOS	129		25 - 150				10/27/16 13:17	10/29/16 14:12	1

Client Sample Results

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

TestAmerica Job ID: 320-22913-1

Client Sample ID: 669077

Date Collected: 10/17/16 15:17

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-5

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L		10/27/16 13:17	10/29/16 14:30	1
Perfluorooctanesulfonic acid (PFOS)	20		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 14:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	170	*	25 - 150				10/27/16 13:17	10/29/16 14:30	1
13C4 PFOS	149		25 - 150				10/27/16 13:17	10/29/16 14:30	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22913-1

Client Sample ID: 87408

Date Collected: 10/17/16 15:48

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-6

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	5.2		2.0	0.75	ng/L		10/27/16 13:17	10/29/16 14:49	1
Perfluorooctanesulfonic acid (PFOS)	30		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 14:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	148		25 - 150				10/27/16 13:17	10/29/16 14:49	1
13C4 PFOS	127		25 - 150				10/27/16 13:17	10/29/16 14:49	1

Client Sample Results

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

TestAmerica Job ID: 320-22913-1

Client Sample ID: 127124

Date Collected: 10/18/16 11:27

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-8

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		10/27/16 13:17	10/29/16 15:25	1
Perfluorooctanesulfonic acid (PFOS)	27		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 15:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	143		25 - 150				10/27/16 13:17	10/29/16 15:25	1
13C4 PFOS	135		25 - 150				10/27/16 13:17	10/29/16 15:25	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22913-1

Client Sample ID: 87319

Date Collected: 10/18/16 12:22

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-9

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		10/27/16 13:17	10/29/16 15:44	1
Perfluorooctanesulfonic acid (PFOS)	19		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 15:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	147		25 - 150				10/27/16 13:17	10/29/16 15:44	1
13C4 PFOS	136		25 - 150				10/27/16 13:17	10/29/16 15:44	1

Client Sample Results

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

TestAmerica Job ID: 320-22913-1

Client Sample ID: MW-507

Date Collected: 10/18/16 16:22

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-10

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		10/27/16 13:17	10/29/16 16:02	1
Perfluorooctanesulfonic acid (PFOS)	160		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 16:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	141		25 - 150				10/27/16 13:17	10/29/16 16:02	1
13C4 PFOS	126		25 - 150				10/27/16 13:17	10/29/16 16:02	1

Client Sample Results

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

TestAmerica Job ID: 320-22913-1

Client Sample ID: EB-507

Date Collected: 10/18/16 16:35

Date Received: 10/21/16 09:35

Lab Sample ID: 320-22913-11

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		10/27/16 13:17	10/29/16 16:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 16:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
¹³ C4 PFOA	149		25 - 150				10/27/16 13:17	10/29/16 16:20	1
¹³ C4 PFOS	133		25 - 150				10/27/16 13:17	10/29/16 16:20	1

Isotope Dilution Summary

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

TestAmerica Job ID: 320-22913-1

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)
320-22913-1	92924	148	132
320-22913-3	87301	149	133
320-22913-4	167754	147	129
320-22913-5	669077	170 *	149
320-22913-6	87408	148	127
320-22913-8	127124	143	135
320-22913-9	87319	147	136
320-22913-10	MW-507	141	126
320-22913-11	EB-507	149	133
LCS 320-134805/2-A	Lab Control Sample	139	130
LCSD 320-134805/3-A	Lab Control Sample Dup	140	129
MB 320-134805/1-A	Method Blank	150	134
Surrogate Legend			
13C4 PFOA = 13C4 PFOA			
13C4 PFOS = 13C4 PFOS			

QC Sample Results

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

TestAmerica Job ID: 320-22913-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-134805/1-A

Matrix: Water

Analysis Batch: 135146

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 134805

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		10/27/16 13:17	10/29/16 12:40	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		10/27/16 13:17	10/29/16 12:40	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	150		25 - 150				10/27/16 13:17	10/29/16 12:40	1
13C4 PFOS	134		25 - 150				10/27/16 13:17	10/29/16 12:40	1

Lab Sample ID: LCS 320-134805/2-A

Matrix: Water

Analysis Batch: 135146

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 134805

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	21.1		ng/L		106	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	16.4		ng/L		88	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	139		25 - 150				
13C4 PFOS	130		25 - 150				

Lab Sample ID: LCSD 320-134805/3-A

Matrix: Water

Analysis Batch: 135146

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 134805

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	21.5		ng/L		107	63 - 141	1	30
Perfluorooctanesulfonic acid (PFOS)	18.6	18.1		ng/L		97	47 - 162	10	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	140		25 - 150						
13C4 PFOS	129		25 - 150						

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-22153-5

LCMS

Prep Batch: 134805

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22153-5	12128	Total/7 A	Water	PFAS Prep	
320-22153-3	N9305	Total/7 A	Water	PFAS Prep	
320-22153-8	549968	Total/7 A	Water	PFAS Prep	
320-22153-6	441099	Total/7 A	Water	PFAS Prep	
320-22153-4	N980N	Total/7 A	Water	PFAS Prep	
320-22153-N	529528	Total/7 A	Water	PFAS Prep	
320-22153-1	N9351	Total/7 A	Water	PFAS Prep	
320-22153-50	MW-609	Total/7 A	Water	PFAS Prep	
320-22153-55	BE-609	Total/7 A	Water	PFAS Prep	
ME 320-538N06/5-A	Method Elank	Total/7 A	Water	PFAS Prep	
LCS 320-538N06/2-A	Lab Control Sample	Total/7 A	Water	PFAS Prep	
LCSD 320-538N06/3-A	Lab Control Sample Dup	Total/7 A	Water	PFAS Prep	

Analysis Batch: 135146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22153-5	12128	Total/7 A	Water	PFAS	538N06
320-22153-3	N9305	Total/7 A	Water	PFAS	538N06
320-22153-8	549968	Total/7 A	Water	PFAS	538N06
320-22153-6	441099	Total/7 A	Water	PFAS	538N06
320-22153-4	N980N	Total/7 A	Water	PFAS	538N06
320-22153-N	529528	Total/7 A	Water	PFAS	538N06
320-22153-1	N9351	Total/7 A	Water	PFAS	538N06
320-22153-50	MW-609	Total/7 A	Water	PFAS	538N06
320-22153-55	BE-609	Total/7 A	Water	PFAS	538N06
ME 320-538N06/5-A	Method Elank	Total/7 A	Water	PFAS	538N06
LCS 320-538N06/2-A	Lab Control Sample	Total/7 A	Water	PFAS	538N06
LCSD 320-538N06/3-A	Lab Control Sample Dup	Total/7 A	Water	PFAS	538N06

Lab Chronicle

Client: Shannon & Wilson
 Site: City of Yairban's yire TraininF Area

TestAmerica Job ID: 320-22483-8

Client Sample ID: 87873

Date CollecteW - 1d / d 6 - 1:- 1

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 02

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepaveW or PnalTueW	PnalTAat	Lab
TotalP: A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2E8R 83:8E	g5p	TA6 SAC
TotalP: A	Analj sis	5yAS		8			83NBRLR	80P248R 83:3N	CBW	TA6 SAC

Client Sample ID: N 01-

Date CollecteW - 1d / d 6 - 0:7-

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 020

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepaveW or PnalTueW	PnalTAat	Lab
TotalP: A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2E8R 83:8E	g5p	TA6 SAC
TotalP: A	Analj sis	5yAS		8			83NBRLR	80P248R 83:N	CBW	TA6 SAC

Client Sample ID: - 6/ / R3

Date CollecteW - 1d / d 6 - 3:03

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 023

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepaveW or PnalTueW	PnalTAat	Lab
TotalP: A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2E8R 83:8E	g5p	TA6 SAC
TotalP: A	Analj sis	5yAS		8			83NBRLR	80P248R 8L:82	CBW	TA6 SAC

Client Sample ID: 6681/ /

Date CollecteW - 1d / d 6 - R- /

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 02R

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepaveW or PnalTueW	PnalTAat	Lab
TotalP: A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2E8R 83:8E	g5p	TA6 SAC
TotalP: A	Analj sis	5yAS		8			83NBRLR	80P248R 8L:30	CBW	TA6 SAC

Client Sample ID: N 31N

Date CollecteW - 1d / d 6 - R3N

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 026

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepaveW or PnalTueW	PnalTAat	Lab
TotalP: A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2E8R 83:8E	g5p	TA6 SAC
TotalP: A	Analj sis	5yAS		8			83NBRLR	80P248R 8L:L4	CBW	TA6 SAC

Client Sample ID: - 7/ - 73

Date CollecteW - 1d / d 6 - - 7/

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 02N

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BrepaveW or PnalTueW	PnalTAat	Lab
TotalP: A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2E8R 83:8E	g5p	TA6 SAC
TotalP: A	Analj sis	5yAS		8			83NBRLR	80P248R 8N:2N	CBW	TA6 SAC

TestAmerica Sacramento

Lab Chronicle

Client: Shannon & Wilson
 5 roect Site: Citj o/ yairbanf s yire TraininF Area

TestAmerica Job ID: 320-22483-8

Client Sample ID: N 0- 8

Date CollecteW - 1d Nd 6 - 7:77

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 028

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BprepareW or PnalTueW	PnalTA	Lab
TotalP A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2ER83:8E	g5p	TA6 SAC
TotalP A	Analj sis	5yAS		8			83N8LR	80P24R8R8NLL	CBW	TA6 SAC

Client Sample ID: 5 x 2R1/

Date CollecteW - 1d Nd 6 - 6:77

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 02 1

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BprepareW or PnalTueW	PnalTA	Lab
TotalP A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2ER83:8E	g5p	TA6 SAC
TotalP A	Analj sis	5yAS		8			83N8LR	80P24R8R8R02	CBW	TA6 SAC

Client Sample ID: Ey 2R1/

Date CollecteW - 1d Nd 6 - 6:0R

Date 9 ecei4eW - 1d - d 6 18:0R

Lab Sample ID: 0712778- 02 -

5 atriM x ater

Brep vTpe	yatch vTpe	yatch 5 ethoW	9 sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	yatch Fsmber	BprepareW or PnalTueW	PnalTA	Lab
TotalP A	5rek	5yAS 5rek			8 m6	89R m6	83L70N	80P2ER83:8E	g5p	TA6 SAC
TotalP A	Analj sis	5yAS		8			83N8LR	80P24R8R8R20	CBW	TA6 SAC

LaboratorT 9 eferenceA:

TA6 SAC V TestAmerica SacramentoM770 =i, ersive 5arf d aj MWest SacramentoMCA 4NR0NMtw6 (48R)3E3-NR00

Certification Summary

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

TestAmerica Job ID: 320-22913-1

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	12-18-16
Arizona	State Program	9	AZ0708	08-11-17
Arkansas DE*	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA000QQ	08-31-17
Connecticut	State Program	1	Pu-0691	06-30-17
Florida	NELAP	Q	E87570	06-30-17
Hawaii	State Program	9	N/A	01-31-17
Illinois	NELAP	5	200060	03-17-17
Indiana	NELAP	7	E-10375	10-31-16 K
Louisiana	NELAP	6	30612	06-30-17
Maine	State Program	1	CA000Q	0Q18-18
Michigan	State Program	5	99Q7	01-31-18
Nevada	State Program	9	CA000QQ	07-31-17
New Jersey	NELAP	2	CA005	06-30-17
New York	NELAP	2	11666	0Q01-17
Oregon	NELAP	10	QQQ	01-29-17
Pennsylvania	NELAP	3	68-01272	03-31-17
Texas	NELAP	6	T10Q70QB99	07-31-17
US Fish & Wildlife	Federal		LE1QB388-0	10-31-17
USDA	Federal		P330-11-00QB6	12-30-17
USEPA UCMR	Federal	1	CA000QQ	11-06-16
Utah	NELAP	8	CA000QQ	02-28-17
Virginia	NELAP	3	Q60278	03-1Q-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

KCertification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson

TestAmerica Job ID: 320-22913-1

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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-22913-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-22913-1	92924	Water	10/17/16 10:10	10/21/16 09:35
320-22913-3	87301	Water	10/17/16 13:21	10/21/16 09:35
320-22913-4	167754	Water	10/17/16 14:34	10/21/16 09:35
320-22913-5	669077	Water	10/17/16 15:17	10/21/16 09:35
320-22913-6	87408	Water	10/17/16 15:48	10/21/16 09:35
320-22913-8	127124	Water	10/18/16 11:27	10/21/16 09:35
320-22913-9	87319	Water	10/18/16 12:22	10/21/16 09:35
320-22913-10	MW-507	Water	10/18/16 16:22	10/21/16 09:35
320-22913-11	EB-507	Water	10/18/16 16:35	10/21/16 09:35

CHAIN-OF-CUSTODY RECORD

Page 1 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	PROT	PROA	TS-LL-025	Total Number of Containers	Remarks/Matrix
92924		1010	10/17/16	X	X				2	groundwater
87173		1215		X	X				2	
87301		1321		X	X				2	
167754		1434		X	X				2	
669077		1517		X	X				2	
87408		1548		X	X				2	
87165		1619		X	X				2	
127124		1127	10/18/16	X	X				2	
87319		1222		X	X				2	
MW-507		1622		X	X				2	



320-22913 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>24</u>		Signature: <u>M. Hadd</u> Time: <u>1100</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>CoF Reg Fire TC</u>		COC Seals/Intact? Y/N/NA: <u>-</u>		Printed Name: _____ Date: <u>10/19/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>MDN</u>		Received Good Cond./Cold: <u>-</u>		Company: <u>Marcy Nadei</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>TXG/MDN</u>		(attach shipping bill, if any)							
Instructions									
Requested Turnaround Time: <u>Standard</u>									
Special Instructions: <u>Please notify upon arrival</u>									
Proj. No: <u>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									
Received By: 1.		Received By: 2.		Received By: 3.					
Signature: <u>Olivia Yardie</u> Time: <u>9:35</u>		Signature: _____ Time: _____		Signature: _____ Time: _____					
Printed Name: _____ Date: <u>10/21/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____					
Company: <u>TAWS</u>		Company: _____		Company: _____					

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Denver, CO 80204
(303) 825-3800

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

CHAIN-OF-CUSTODY RECORD

Page 2 of 2

Laboratory Test America
Attn: David Altshuler

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

[illegible]

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

No. 34236

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-22913-1

Login Number: 22913

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is <= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	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	Refer to Job Narrative for details.
Cooler Temperature is acceptable.	False	
Cooler Temperature is recorded.	True	
Cq C is present.	True	
Cq C is filled out in ink and legible.	True	
Cq C is filled out with all pertinent information.	True	
Is the Field Sampler's name present on Cq CI	True	
There are no discrepancies between the containers received and the Cq C.	True	
Samples are received within ?olding Time He(cluding tests with immediate ? Tsx	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) reservation Perified.	N/A	
There is sufficient vol. for all reVuested analyses, incl. any reVuested MS/MSDs	True	
Containers reVuring zero headspace have no headspace or bubble is <6mm H/4"x	True	
Multiphasic samples are not present.	True	
Samples do not reVuire splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Laboratory Data Review Checklist

Completed by: Sheila Hinckley

Title: Environmental Scientist Date: October 31, 2016

CS Report Name: City of Fairbanks Fire Training Area Report Date: October 31, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-22913-1

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 PFCs analysis.

- 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 measured at 6.2°C , outside the acceptable temperature range of 0°C to 6°C upon receipt at the laboratory, as specified in the EPA publication SW-846, and 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:

The cooler temperature was measured outside the acceptable temperature range of 0 °C to 6 °C upon receipt at the laboratory (6.2 °C).

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

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 ☐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:

Samples 87173, 81765, and 87157 were deactivated by client on 10/26/16.

The isotope dilution analyte (IDA) recovery is above the method recommended limit for project sample 669077.

The laboratory noted the following samples were orange, and contained some dark orange residue on the bottom of the containers; 320-22913-1, 320-22913-4, 320-22913-5, 320-22913-6, 320-22913-9, and 320-22913-10.

The laboratory noted that there was insufficient sample volume to analyze a matrix spike (MS) and a matrix spike duplicate (MSD) sample for preparation batch 320-134805.

- 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 affect 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 level 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:

N/A; PFCs were not detected above the PQL in method blank MB 320-134805/1-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 for PFCs 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 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; percent recoveries and RPDs were within acceptable limits. The maximum RPD reported was 10%.

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:

¹³C4-isotope was recovered above the acceptable limits of 25% to 150% for the extraction of project sample 669077.

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 PFOA result for project sample 669077 is affected by the ¹³C4-isotope failure. The result is considered estimated, and flagged with a 'J' in the database and analytical tables.

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

Comments:

Yes; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

☐ Yes ☐ No ☒ 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; see above.

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

Comments:

A trip blank was not required; see above.

- 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 with a frequency of 10% for the overall project.

ii. Submitted blind to lab?

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

A field duplicate pair was not submitted with this work order.

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.

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

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

A reusable pumps was used during collection of one of the samples in this WO. An equipment blank sample "EB-507" was submitted with this WO.

i. All results less than PQL?

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

PFC analytes were not detected in sample "EB-507."

ii. If above PQL, what samples are affected?

Comments:

N/A; no results were above the PQL.

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: 320-22921-1

TestAmerica Sample Delivery Group: 31-1-11735-007/006

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:

11/2/2016 8:38:38 AM

David Alltucker, Project Manager I

(916)374-4383

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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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-22921-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
J	Result is less than the μ L but greater than or equal to the wDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
v	Listed under the μ g column to designate that the result is reported on a dry weight basis
E %	Percent recovery
CFL	Contains Free Lead
C(F	Contains no Free Lead
Dz %	Duplicate error ratio (normal, absolute difference)
Dil Fac	Dilution Factor
DLM, AM, z M(	Indicates a Dilution Method analysis Method or additional Initial metals/anion analysis of the sample
DLC	Decision Level concentration
wDA	minimum detectable activity
zDL	estimated Detection Limit
wDC	minimum detectable concentration
wDL	method Detection Limit
wL	minimum Level (Dioxin)
(C	(not Calculated)
(D	(not detected at the reporting limit) or wDL or zDL if shown
PQL	Practical Quantitation Limit
QC	Quality Control
z %	relative error ratio
μ L	reporting Limit or μ L tested Limit (radiochemistry)
μ PD	relative Percent Difference (a measure of the relative difference between two points)
Tz F	Toxicity Z Factor (Dioxin)
Tz Q	Toxicity Z Factor (Quotient) (Dioxin)

Case Narrative

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

TestAmerica Job ID: 320-22921-1

Job ID: 320-22921-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-22921-1

Receipt

The samples were received on 10/21/2016 9:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.4° 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":

Method(s) PFAS: Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following samples: 168823 (320-22921-2), 168831 (320-22921-3), 168874 (320-22921-4), 168974 (320-22921-5), 168149 (320-22921-6), 168273 (320-22921-7), 168173 (320-22921-8), 147460 (320-22921-12), (LCS 320-135332/2-A) and (LCSD 320-135332/3-A). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

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 320-134651.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-135332.

Method(s) PFAS Prep: The following samples are orange in color, and contain some residue on the bottom. 64751 (320-22921-1), 168831 (320-22921-3), 168874 (320-22921-4), 168974 (320-22921-5), 168149 (320-22921-6), 168273 (320-22921-7), 168173 (320-22921-8), 129089 (320-22921-10), 515493-SW (320-22921-11), 147460 (320-22921-12) and MW-301D (320-22921-13)

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: 320-22921-1

Client Sample ID: 16854

Lab Sample ID: 320-22R24-4

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	17	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohe6anesulfonic acid (PF4 6S)	37	2N	0N8x ng/.	1	PFAS	Total/L A
PerfluoroheHtanoic acid (PF4 HA)	1p	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	20	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	19	2N	1N3 ng/.	1	PFAS	Total/L A
Perfluorononanoic acid (PFL A)	2N	2N	0N7 ng/.	1	PFAS	Total/L A

Client Sample ID: 417723

Lab Sample ID: 320-22R24-2

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	xN	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohe6anesulfonic acid (PF4 6S)	30	2N	0N8x ng/.	1	PFAS	Total/L A
PerfluoroheHtanoic acid (PF4 HA)	pN	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	10	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	110	2N	1N3 ng/.	1	PFAS	Total/L A
Perfluorononanoic acid (PFL A)	0N8 J	2N	0N7 ng/.	1	PFAS	Total/L A

Client Sample ID: 417734

Lab Sample ID: 320-22R24-3

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	pN	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohe6anesulfonic acid (PF4 6S)	23	2N	0N8x ng/.	1	PFAS	Total/L A
PerfluoroheHtanoic acid (PF4 HA)	1N J	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	7N	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	8x	2N	1N3 ng/.	1	PFAS	Total/L A
Perfluorononanoic acid (PFL A)	0N8 J	2N	0N7 ng/.	1	PFAS	Total/L A

Client Sample ID: 417786

Lab Sample ID: 320-22R24-6

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	3N	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohe6anesulfonic acid (PF4 6S)	19	2N	0N8x ng/.	1	PFAS	Total/L A
PerfluoroheHtanoic acid (PF4 HA)	1N J	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	7N	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	01	2N	1N3 ng/.	1	PFAS	Total/L A

Client Sample ID: 417R86

Lab Sample ID: 320-22R24-5

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	3N	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohe6anesulfonic acid (PF4 6S)	20	2N	0N8x ng/.	1	PFAS	Total/L A
PerfluoroheHtanoic acid (PF4 HA)	1N J	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	7N	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	08	2N	1N3 ng/.	1	PFAS	Total/L A

Client Sample ID: 41746R

Lab Sample ID: 320-22R24-1

s nalyte	MeQult f ualiUer	ML	ADL Fnit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	2N	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohe6anesulfonic acid (PF4 6S)	17	2N	0N8x ng/.	1	PFAS	Total/L A

This Detection Summary does not include radiochemical test resultsN

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 41746R(ContinueP)

Lab Sample ID: 320-22R24-1

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac	D AetdoP	Trep 9ype
Perfluorohetanoic acid (PF4 HA)	1N J	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	pN	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	xN	2N	1N3 ng/.	1	PFAS	Total/L A

Client Sample ID: 417283

Lab Sample ID: 320-22R24-8

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	1N J	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohexanesulfonic acid (PF4 6S)	8N	2N	0N8x ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	2N	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	1x	2N	1N3 ng/.	1	PFAS	Total/L A

Client Sample ID: 417483

Lab Sample ID: 320-22R24-7

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	1N J	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohexanesulfonic acid (PF4 6S)	9N	2N	0N8x ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	2N	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	1O	2N	1N3 ng/.	1	PFAS	Total/L A

Client Sample ID: 41816R-SW

Lab Sample ID: 320-22R24-R

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	ON	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohexanesulfonic acid (PF4 6S)	31	2N	0N8x ng/.	1	PFAS	Total/L A
Perfluorohetanoic acid (PF4 HA)	pN	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	11	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	97	2N	1N3 ng/.	1	PFAS	Total/L A
Perfluorononanoic acid (PFL A)	2N	2N	0N7 ng/.	1	PFAS	Total/L A

Client Sample ID: 42R07R

Lab Sample ID: 320-22R24-40

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	xN	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohexanesulfonic acid (PF4 6S)	39	2N	0N8x ng/.	1	PFAS	Total/L A
Perfluorohetanoic acid (PF4 HA)	10	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	19	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	18	2N	1N3 ng/.	1	PFAS	Total/L A

Client Sample ID: 5456R3-SW

Lab Sample ID: 320-22R24-44

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac	D AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	xN	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohexanesulfonic acid (PF4 6S)	77	2N	0N8x ng/.	1	PFAS	Total/L A
Perfluorohetanoic acid (PF4 HA)	13	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	7O	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	110	2N	1N3 ng/.	1	PFAS	Total/L A
Perfluorononanoic acid (PFL A)	ON	2N	0N7 ng/.	1	PFAS	Total/L A

Client Sample ID: 468610

Lab Sample ID: 320-22R24-42

This Detection Summary does not include radiochemical test resultsN

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 468610 (ContinueP)

Lab Sample ID: 320-22R24-42

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	28	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohe6anesulfonic acid (PF4 6S)	1p0	2N	0N8x ng/.	1	PFAS	Total/L A
PerfluoroheHanoic acid (PF4 HA)	xN	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	22	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	2p0	2N	1N3 ng/.	1	PFAS	Total/L A

Client Sample ID: AW-304D

Lab Sample ID: 320-22R24-43

s nalyte	MeQult f ualiUer	ML	ADL F nit	Dil hac D	AetdoP	Trep 9ype
Perfluorobutanesulfonic acid (PFBS)	xN	2N	0N2 ng/.	1	PFAS	Total/L A
Perfluorohe6anesulfonic acid (PF4 6S)	71	2N	0N8x ng/.	1	PFAS	Total/L A
PerfluoroheHanoic acid (PF4 HA)	7N	2N	0N0 ng/.	1	PFAS	Total/L A
Perfluorooctanoic acid (PF5 A)	11	2N	0N7 ng/.	1	PFAS	Total/L A
Perfluorooctanesulfonic acid (PF5 S)	p0	2N	1N3 ng/.	1	PFAS	Total/L A

This Detection Summary does not include radiochemical test resultsN

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 685M4

Date Collected: 40945916 44:22

Date Received: 40924916 01:3M

Lab Sample ID: 320-22124-4

atxW o atex

PFAS - Pexflucxinate/ Alkyl Substances

Analyte	Result	Qualifier	RL	r DL	Unit	D	Prepared	Analyze	Dil Fac
Pexflucxbutanesulfonidadi/ (PFBS)	4M		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 06:16	1
Pexflucxheptanesulfonidadi/ (PFHVS)	3M		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 06:16	1
Pexflucxheptanacidadi/ (PFHpA)	48		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 06:16	1
Pexflucxcdtanacidadi/ (PFOA)	26		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 06:16	1
Pexflucxcdtananesulfonidadi/ (PFOS)	41		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 06:16	1
Pexflucxncnancidadi/ (PFNA)	2.5		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 06:16	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	118		24 514-	1- 0 10/16 1631	110 10/16 - 63/6	1
1/ 9 C3PFHpA	1/ 8		24 514-	1- 0 10/16 1631	110 10/16 - 63/6	1
1/ 9 C4PFOA	106		24 514-	1- 0 10/16 1631	110 10/16 - 63/6	1
1/ 9 C5PFOS	128		24 514-	1- 0 10/16 1631	110 10/16 - 63/6	1
1/ 9 4 PFNA	108		24 514-	1- 0 10/16 1631	110 10/16 - 63/6	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 467723

Date Collected: 40947916 01:20

Date Received: 40924916 01:3M

Lab Sample ID: 320-22124-2

retrieved at

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonic acid (PFBS)	5.7		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 06:35	1
Perfluorohexanesulfonic acid (PFHxS)	36		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 06:35	1
Perfluorooctanoic acid (PFHpA)	8.8		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 06:35	1
Perfluorodecanoic acid (PFOA)	40		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 06:35	1
Perfluorododecanesulfonic acid (PFOS)	440		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 06:35	1
Perfluorotridecanoic acid (PFNA)	0.17	J	2.0	0.65	ng/L		10/31/16 16:17	11/01/16 06:35	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	11/		24 514-	1- 0 10/16 16:31	110 10/16 - 63 4	1
1/ 9 C PFHpA	1/ /		24 514-	1- 0 10/16 16:31	110 10/16 - 63 4	1
1/ 9 C PFOA	106		24 514-	1- 0 10/16 16:31	110 10/16 - 63 4	1
1/ 9 C PFOS	121		24 514-	1- 0 10/16 16:31	110 10/16 - 63 4	1
1/ 9 4 PFNA	141	7	24 514-	1- 0 10/16 16:31	110 10/16 - 63 4	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 467734

Date Collected: 40947916 40:30

Date Received: 40924916 01:30

Lab Sample ID: 320-22124-3

retrieved atex

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	Reported DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonate (PFBS)	8.8		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 06:53	1
Perfluorohexanesulfonate (PFHxS)	23		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 06:53	1
Perfluorooctanoate (PFHpA)	4.5	J	2.0	0.80	ng/L		10/31/16 16:17	11/01/16 06:53	1
Perfluorooctanoate (PFOA)	M7		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 06:53	1
Perfluorodecansulfonate (PFOS)	75		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 06:53	1
Perfluorododecansulfonate (PFNA)	0.65	J	2.0	0.65	ng/L		10/31/16 16:17	11/01/16 06:53	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	12C		24 514-	1- 10/16 16:31	11/01/16 - 6:31	1
1/ 9 C PFHpA	10C		24 514-	1- 10/16 16:31	11/01/16 - 6:31	1
1/ 9 C PFOA	146 7		24 514-	1- 10/16 16:31	11/01/16 - 6:31	1
1/ 9 C PFOS	1/ 2		24 514-	1- 10/16 16:31	11/01/16 - 6:31	1
1/ 9 4 PFNA	14: 7		24 514-	1- 10/16 16:31	11/01/16 - 6:31	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 467758

Date Collected: 40947916 43:30

Date Received: 40924916 01:30

Lab Sample ID: 320-22124-8

re-attempt

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonic acid (PFBS)	3.5		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 07:11	1
Perfluorohexanesulfonic acid (PFHxS)	41		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 07:11	1
Perfluorooctanoic acid (PFHpA)	4.3	J	2.0	0.80	ng/L		10/31/16 16:17	11/01/16 07:11	1
Perfluorooctanesulfonic acid (PFOA)	M2		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 07:11	1
Perfluorodecane sulfonic acid (PFOS)	64		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 07:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 07:11	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	1/2		24 514-	1- 10/16 16:31	11/01/16 - : 311	1
1/9 C13 PFHpA	148	7	24 514-	1- 10/16 16:31	11/01/16 - : 311	1
1/9 C13 PFOA	16*	7	24 514-	1- 10/16 16:31	11/01/16 - : 311	1
1/9 C13 PFOS	101		24 514-	1- 10/16 16:31	11/01/16 - : 311	1
1/9 4 PFNA	16/	7	24 514-	1- 10/16 16:31	11/01/16 - : 311	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 467158

Date Collected: 40947916 43:20

Date Received: 40924916 01:3M

Lab Sample ID: 320-22124-M

atxW o atex

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonic acid (PFBS)	3.5		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 07:30	1
Perfluorohexanesulfonic acid (PFHxS)	20		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 07:30	1
Perfluorooctanoic acid (PFHpA)	4.3	J	2.0	0.80	ng/L		10/31/16 16:17	11/01/16 07:30	1
Perfluorooctanesulfonic acid (PFOA)	MM		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 07:30	1
Perfluorodecane sulfonic acid (PFOS)	63		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 07:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 07:30	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	12:		24 514-	1- 0 10/16 16:31	110 10/16 - : 3 -	1
1/ 9 C3 PFHpA	141	7	24 514-	1- 0 10/16 16:31	110 10/16 - : 3 -	1
1/ 9 C4 PFOA	16-	7	24 514-	1- 0 10/16 16:31	110 10/16 - : 3 -	1
1/ 9 C6 PFOS	1/ :		24 514-	1- 0 10/16 16:31	110 10/16 - : 3 -	1
1/ 9 4 PFNA	14*	7	24 514-	1- 0 10/16 16:31	110 10/16 - : 3 -	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 467481

Date Collected: 40947916 48:00

Date Received: 40924916 01:3M

Lab Sample ID: 320-22124-6

re-attempt

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonate (PFBS)	2.3		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 07:48	1
Perfluorohexanesulfonate (PFHxS)	4M		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 07:48	1
Perfluorooctanoate (PFHpA)	4.4	J	2.0	0.80	ng/L		10/31/16 16:17	11/01/16 07:48	1
Perfluorooctanoate (PFOA)	8.0		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 07:48	1
Perfluorodecansulfonate (PFOS)	5.8		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 07:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 07:48	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	1/2		24 514-	10/31/16 16:31	11/01/16 07:38	1
1/9 C13 PFHpA	14: 7		24 514-	10/31/16 16:31	11/01/16 07:38	1
1/9 C13 PFOA	1: 2 7		24 514-	10/31/16 16:31	11/01/16 07:38	1
1/9 C13 PFOS	100		24 514-	10/31/16 16:31	11/01/16 07:38	1
1/9 4 PFNA	16C 7		24 514-	10/31/16 16:31	11/01/16 07:38	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 467253

Date Collected: 40947946 46:27

Date Received: 40924946 01:3M

Lab Sample ID: 320-22124-5

re-attempt

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonic acid (PFBS)	4.6	J	2.0	0.92	ng/L		10/31/16 16:17	11/01/16 08:06	1
Perfluorohexanesulfonic acid (PFHxS)	7.5		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 08:06	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 08:06	1
Perfluorooctanoic acid (PFOA)	2.3		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 08:06	1
Perfluorooctanesulfonic acid (PFOS)	45		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 08:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 08:06	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	126		24 514-	1- 10/16 16:31	11/01/16 - 83 6	1
1/ 9 C PFHpA	14-		24 514-	1- 10/16 16:31	11/01/16 - 83 6	1
1/ 9 C PFOA	16- 7		24 514-	1- 10/16 16:31	11/01/16 - 83 6	1
1/ 9 C PFOS	1/ 4		24 514-	1- 10/16 16:31	11/01/16 - 83 6	1
1/ 9 4 PFNA	146 7		24 514-	1- 10/16 16:31	11/01/16 - 83 6	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 467453

Date Collected: 40947916 46:37

Date Received: 40924916 01:3M

Lab Sample ID: 320-22124-7

re-attempt

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	Reportable Limit	Unit	Detected	Prepared	Analyzed	Dilution Factor
Perfluorobutanesulfonic acid (PFBS)	4.6	J	2.0	0.92	ng/L		10/31/16 16:17	11/01/16 08:43	1
Perfluorohexanesulfonic acid (PFHxS)	1.4		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 08:43	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 08:43	1
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 08:43	1
Perfluorooctanesulfonic acid (PFOS)	46		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 08:43	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 08:43	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dilution Factor
¹⁸ O ₂ PFHxS	12*		24-514-	10/31/16 16:31	11/01/16 - 8:30	1
1/9 C ¹³ PFHpA	141	7	24-514-	10/31/16 16:31	11/01/16 - 8:30	1
1/9 C ¹³ PFOA	164	7	24-514-	10/31/16 16:31	11/01/16 - 8:30	1
1/9 C ¹³ PFOS	1/*		24-514-	10/31/16 16:31	11/01/16 - 8:30	1
1/9 ⁴ PFNA	162	7	24-514-	10/31/16 16:31	11/01/16 - 8:30	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 465681-So

Date Collected: 40947916 01:MD

Date Received: 40924916 01:3M

Lab Sample ID: 320-22124-1

atxW o atex

PFAS - Pexflucxinate/ Alkyl Substances

Analyte	Result	Qualifier	RL	r DL	Unit	D	Prepared	Analyze	Dil Fac
Pexflucxbutanesulfonidadi/ (PFBS)	6.4		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 09:01	1
Pexflucxheptanesulfonidadi/ (PFHxS)	34		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 09:01	1
Pexflucxheptanecidadi/ (PFHpA)	8.8		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 09:01	1
Pexflucxcdtanecidadi/ (PFOA)	44		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 09:01	1
Pexflucxcdtanecidadi/ (PFOS)	1M		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 09:01	1
Pexflucxcnecidadi/ (PFNA)	2.8		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 09:01	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1-2		24 514-	1-0 10/16 1631	110 10/16 - *3 1	1
1/9 C3PFHpA	118		24 514-	1-0 10/16 1631	110 10/16 - *3 1	1
1/9 C4PFOA	12:		24 514-	1-0 10/16 1631	110 10/16 - *3 1	1
1/9 C5PFOS	1-8		24 514-	1-0 10/16 1631	110 10/16 - *3 1	1
1/9 4 PFNA	12:		24 514-	1-0 10/16 1631	110 10/16 - *3 1	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 421071

Date Collected: 40947916 40:27

Date Received: 40924916 01:3M

Lab Sample ID: 320-22124-40

re-attempt

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	Conc	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonic acid (PFBS)	5.0	M	2.0	0.92	ng/L		10/31/16 16:17	11/01/16 09:20	1
Perfluorohexanesulfonic acid (PFHxS)	31		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 09:20	1
Perfluorooctanoic acid (PFHpA)	40		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 09:20	1
Perfluorooctanesulfonic acid (PFOA)	41		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 09:20	1
Perfluorodecane sulfonic acid (PFOS)	47		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 09:20	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 09:20	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	1-*		24 514-	1- 10/16 16:31	11/01/16 - * 3-	1
1/9 C13 PFHpA	12C		24 514-	1- 10/16 16:31	11/01/16 - * 3-	1
1/9 C13 PFOA	1/8		24 514-	1- 10/16 16:31	11/01/16 - * 3-	1
1/9 C13 PFOS	11:		24 514-	1- 10/16 16:31	11/01/16 - * 3-	1
1/9 4 PFNA	1/6		24 514-	1- 10/16 16:31	11/01/16 - * 3-	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: **M4B13-So**

Lab Sample ID: **320-22124-44**

Date Collected: 40947916 44:0M

r atxW o atex

Date Received: 40924916 01:3M

r ethc/ : PFAS - Pexflucxinate/ Alkyl Substances

Analyte	Result	Qualifier	RL	r DL	Unit	D	Prepared	Analyze	Dil Fac
Pexflucxbutanesulfonidadi/ (PFBS)	5.7		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 09:38	1
Pexflucxheptanesulfonidadi/ (PFHxS)	MM		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 09:38	1
Pexflucxheptanoic acid/ (PFHpA)	43		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 09:38	1
Pexflucxoctanoic acid/ (PFOA)	M6		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 09:38	1
Pexflucxundecanoic acid/ (PFOS)	440		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 09:38	1
Pexflucxnonanoic acid/ (PFNA)	6.5		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 09:38	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	*7		24 514-				1- 0 10/16 16:31	110 10/16 - *3 8	1
1/ 9 C PFHpA	*8		24 514-				1- 0 10/16 16:31	110 10/16 - *3 8	1
1/ 9 C PFOA	11C		24 514-				1- 0 10/16 16:31	110 10/16 - *3 8	1
1/ 9 C PFOS	**		24 514-				1- 0 10/16 16:31	110 10/16 - *3 8	1
1/ 9 4 PFNA	11:		24 514-				1- 0 10/16 16:31	110 10/16 - *3 8	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: 485860

Date Collected: 40947916 42:85

Date Received: 40924916 01:3M

Lab Sample ID: 320-22124-42

re-attempt

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorobutanesulfonic acid (PFBS)	27		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 09:56	1
Perfluorohexanesulfonic acid (PFHxS)	480		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 09:56	1
Perfluorooctanoic acid (PFHpA)	5.8		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 09:56	1
Perfluorooctanesulfonic acid (PFOA)	22		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 09:56	1
Perfluorodecane sulfonic acid (PFOS)	280		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 09:56	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 09:56	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Factor
18O2 PFHxS	12C		24 514-	1- 10/16 16:31	11/01/16 - *316	1
1/ 9 C PFHpA	1C2		24 514-	1- 10/16 16:31	11/01/16 - *316	1
1/ 9 C PFOA	14C 7		24 514-	1- 10/16 16:31	11/01/16 - *316	1
1/ 9 C PFOS	12*		24 514-	1- 10/16 16:31	11/01/16 - *316	1
1/ 9 4 PFNA	142 7		24 514-	1- 10/16 16:31	11/01/16 - *316	1

Client Sample Results

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

TestAmerica Job ID: 320-22921-1

Client Sample ID: r o -304D

Lab Sample ID: 320-22124-43

Date Collected: 40947946 48:33

r atxW o atex

Date Received: 40924946 01:3M

r ethc/ : PFAS - Pexflucxinate/ Alkyl Substances

Analyte	Result	Qualifier	RL	r DL	Unit	D	Prepared	Analyze	Dil Fac
Pexflucxbutanesulfonid adi/ (PFBS)	5.4		2.0	0.92	ng/L		10/31/16 16:17	11/01/16 10:15	1
Pexflucxheptanesulfonid adi/ (PFHVS)	M4		2.0	0.87	ng/L		10/31/16 16:17	11/01/16 10:15	1
Pexflucxheptanoid adi/ (PFHpA)	M4		2.0	0.80	ng/L		10/31/16 16:17	11/01/16 10:15	1
Pexflucxcdtanoid adi/ (PFOA)	44		2.0	0.75	ng/L		10/31/16 16:17	11/01/16 10:15	1
Pexflucxcdtanoid adi/ (PFOS)	80		2.0	1.3	ng/L		10/31/16 16:17	11/01/16 10:15	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/31/16 16:17	11/01/16 10:15	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	12/		24 514-	1- 0 10/16 16:31	110 10/16 1- 314	1
1/ 9 C ¹³ PFHpA	10/		24 514-	1- 0 10/16 16:31	110 10/16 1- 314	1
1/ 9 C ¹³ PFOA	10*		24 514-	1- 0 10/16 16:31	110 10/16 1- 314	1
1/ 9 C ¹³ PFOS	1/ -		24 514-	1- 0 10/16 16:31	110 10/16 1- 314	1
1/ 9 4 PFNA	14-		24 514-	1- 0 10/16 16:31	110 10/16 1- 314	1

Isotope Dilution Summary

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&roActP ite: 5 itj o/ yairbaC's yire TraiQCf Area

TestAmerica Job ID: 320-22428-8

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)
320-22428-8	6g798	88k	83k	8g6	82k	8gk
320-22428-2	86kk23	883	833	8g6	828	898 *
320-22428-3	86kk38	82g	8gg	896 *	832	897 *
320-22428-g	86kk7g	832	89k *	864 *	8g8	863 *
320-22428-9	86k47g	827	898 *	860 *	837	894 *
320-22428-6	86k8g4	832	897 *	872 *	8gg	86g *
320-22428-7	86k273	826	890	860 *	839	896 *
320-22428-k	86k873	824	898 *	869 *	834	862 *
320-22428-4	8676g4-l h	802	88k	827	80k	827
320-22428-80	8240k4	804	82g	83k	887	836
320-22428-88	989g43-l h	43	4k	88g	44	887
320-22428-82	8g7g60	82g	8g2	89g *	824	892 *
320-22428-83	L h -308D	823	8g3	8g4	830	890
p5l 320-839332P-A	pab 5 oCtro1l amu1e	822	8g9	899 *	833	8g4
p5l D 320-839332P-A	pab 5 oCtro1l amu1e DMu	82g	892 *	897 *	833	892 *
L B 320-839332P-A	L etnod B1aCf	88k	8g2	890	838	8g7

Surrogate Legend

8kO2 &y Hxl = 8kO2 &y Hxl
835 g-&y HuA = 835 g-&y HuA
835 g &y OA = 835 g &y OA
835 g &y OI = 835 g &y OI
835 9 &y NA = 835 9 &y NA

QC Sample Results

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

TestAmerica Job ID: 320-22921-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-135332/1-A

Matrix: Water

Analysis Batch: 135369

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 135332

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		10/31/17 17:16	11/01/17 04:21	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.86	ng/L		10/31/17 17:16	11/01/17 04:21	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		10/31/17 17:16	11/01/17 04:21	1
Perfluorooctanoic acid (PF5 A)	ND		2.0	0.64	ng/L		10/31/17 17:16	11/01/17 04:21	1
Perfluorooctanesulfonic acid (PF5 S)	ND		2.0	1.3	ng/L		10/31/17 17:16	11/01/17 04:21	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.74	ng/L		10/31/17 17:16	11/01/17 04:21	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	118		24 514-	1- 0810/ 1/ 6/	110 10/ - 4021	1
13C9 PFHpA	192		24 514-	1- 0810/ 1/ 6/	110 10/ - 4021	1
13C9 PFOA	14-		24 514-	1- 0810/ 1/ 6/	110 10/ - 4021	1
13C9 PFOS	131		24 514-	1- 0810/ 1/ 6/	110 10/ - 4021	1
13C4 PFNA	19-		24 514-	1- 0810/ 1/ 6/	110 10/ - 4021	1

Lab Sample ID: LCS 320-135332/2-A

Matrix: Water

Analysis Batch: 135369

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 135332

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	16.6	18.8		ng/L		106	44 - 106
Perfluorohexanesulfonic acid (PFHxS)	18.2	19.9		ng/L		109	48 - 138
Perfluoroheptanoic acid (PFHpA)	20.0	22.1		ng/L		111	73 - 134
Perfluorooctanoic acid (PF5 A)	20.0	21.1		ng/L		104	73 - 101
Perfluorooctanesulfonic acid (PF5 S)	18.7	16.8		ng/L		97	06 - 172
Perfluorononanoic acid (PFNA)	20.0	22.4		ng/L		113	61 - 100

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	122		24 514-
13C9 PFHpA	194		24 514-
13C9 PFOA	144 7		24 514-
13C9 PFOS	133		24 514-
13C4 PFNA	19*		24 514-

Lab Sample ID: LCSD 320-135332/3-A

Matrix: Water

Analysis Batch: 135369

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 135332

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limit.	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	16.6	18.9		ng/L		106	44 - 106	0	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	20.7		ng/L		113	48 - 138	3	30
Perfluoroheptanoic acid (PFHpA)	20.0	21.8		ng/L		109	73 - 134	1	30
Perfluorooctanoic acid (PF5 A)	20.0	21.6		ng/L		108	73 - 101	3	30
Perfluorooctanesulfonic acid (PF5 S)	18.7	18.1		ng/L		96	06 - 172	1	30
Perfluorononanoic acid (PFNA)	20.0	22.8		ng/L		110	61 - 100	1	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson

TestAmerica Job ID: 320-22921-1

Project/Site: City of Fairbanks Fire Training Area

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
18O2 PFHxS	129		24 514-
13C9 5 PFHpA	142	7	24 514-
13C9 PFOA	14:	7	24 514-
13C9 PFOS	133		24 514-
13C4 PFNA	142	7	24 514-

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QC Association Summary

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

TestAmerica Job ID: 320-22921-1

LCMS

Prep Batch: 135332

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22921-1	67541	Total/NA	Water	PFAS Prep	
320-22921-2	168823	Total/NA	Water	PFAS Prep	
320-22921-3	168831	Total/NA	Water	PFAS Prep	
320-22921-7	168857	Total/NA	Water	PFAS Prep	
320-22921-4	168957	Total/NA	Water	PFAS Prep	
320-22921-6	168179	Total/NA	Water	PFAS Prep	
320-22921-5	168253	Total/NA	Water	PFAS Prep	
320-22921-8	168153	Total/NA	Water	PFAS Prep	
320-22921-9	165679-SW	Total/NA	Water	PFAS Prep	
320-22921-10	129089	Total/NA	Water	PFAS Prep	
320-22921-11	414793-SW	Total/NA	Water	PFAS Prep	
320-22921-12	175760	Total/NA	Water	PFAS Prep	
320-22921-13	MW-301D	Total/NA	Water	PFAS Prep	
MB 320-134332/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-134332/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-134332/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 135369

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-22921-1	67541	Total/NA	Water	PFAS	134332
320-22921-2	168823	Total/NA	Water	PFAS	134332
320-22921-3	168831	Total/NA	Water	PFAS	134332
320-22921-7	168857	Total/NA	Water	PFAS	134332
320-22921-4	168957	Total/NA	Water	PFAS	134332
320-22921-6	168179	Total/NA	Water	PFAS	134332
320-22921-5	168253	Total/NA	Water	PFAS	134332
320-22921-8	168153	Total/NA	Water	PFAS	134332
320-22921-9	165679-SW	Total/NA	Water	PFAS	134332
320-22921-10	129089	Total/NA	Water	PFAS	134332
320-22921-11	414793-SW	Total/NA	Water	PFAS	134332
320-22921-12	175760	Total/NA	Water	PFAS	134332
320-22921-13	MW-301D	Total/NA	Water	PFAS	134332
MB 320-134332/1-A	Method Blank	Total/NA	Water	PFAS	134332
LCS 320-134332/2-A	Lab Control Sample	Total/NA	Water	PFAS	134332
LCSD 320-134332/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	134332

Lab Chronicle

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

TestAmerica Job ID: 320-22124-4

Client Sample ID: x d 13- 9D

Lab Sample ID: 30- 100M9193

Date Collected: 9- /95/98 97:33

x atriW d ater

Date Received: 9- /09/98 - M34

Prep Type	Batch Type	Batch x etho6	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Totalj8 A	6reg	6f AS 6reg			4 mL	4111 mL	437332	40j34j4R4R49	p6E	TAL SAC
Totalj8 A	Anal/ sis	6f AS		4			4373R1	44j04j4R40:47	S. 5	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 1000 Divisadero Street, West Sacramento, CA 95690, T. L. (916) 393-7000

Certification Summary

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

TestAmerica Job ID: 320-22921-1

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	12-18-16
Arizona	State Program	9	AZ0708	08-11-17
Arkansas DE*	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA000QQ	08-31-17
Connecticut	State Program	1	Pu-0691	06-30-17
Florida	NELAP	Q	E87570	06-30-17
Hawaii	State Program	9	N/A	01-31-17
Illinois	NELAP	5	200060	03-17-17
Indiana	NELAP	7	E-10375	10-31-16 K
Louisiana	NELAP	6	30612	06-30-17
Maine	State Program	1	CA000Q	0Q18-18
Michigan	State Program	5	99Q7	01-31-18
Nevada	State Program	9	CA000QQ	07-31-17
New Jersey	NELAP	2	CA005	06-30-17
New York	NELAP	2	11666	0Q01-17
Oregon	NELAP	10	QQQ	01-29-17
Pennsylvania	NELAP	3	68-01272	03-31-17
Texas	NELAP	6	T10Q70QB99	07-31-17
US Fish & Wildlife	Federal		LE1QB388-0	10-31-17
USDA	Federal		P330-11-00QB6	12-30-17
USEPA UCMR	Federal	1	CA000QQ	11-06-16
Utah	NELAP	8	CA000QQ	02-28-17
Virginia	NELAP	3	Q60278	03-1Q-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

KCertification renewal pending - certification considered valid.

TestAmerica Sacramento

Method Summary

Client: Shannon & Wilson

TestAmerica Job ID: 320-22921-1

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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-22921-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-22921-1	67541	Water	10/15/16 11:22	10/21/16 09:34
320-22921-2	168823	Water	10/18/16 09:20	10/21/16 09:34
320-22921-3	168831	Water	10/18/16 10:30	10/21/16 09:34
320-22921-7	168857	Water	10/18/16 13:30	10/21/16 09:34
320-22921-4	168957	Water	10/18/16 13:20	10/21/16 09:34
320-22921-6	168179	Water	10/18/16 17:00	10/21/16 09:34
320-22921-5	168253	Water	10/18/16 16:28	10/21/16 09:34
320-22921-8	168153	Water	10/18/16 16:38	10/21/16 09:34
320-22921-9	165679-SW	Water	10/18/16 09:40	10/21/16 09:34
320-22921-10	129089	Water	10/18/16 10:28	10/21/16 09:34
320-22921-11	414793-SW	Water	10/18/16 11:04	10/21/16 09:34
320-22921-12	175760	Water	10/18/16 12:75	10/21/16 09:34
320-22921-13	MW-301D	Water	10/18/16 17:33	10/21/16 09:34

CHAIN-OF-CUSTODY RECORD

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

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0606

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	FFCS (X6 UHP)	WS-LC-0025	Total Number of Containers	Remarks/Matrix
64751		1122	10/17/16	X	X			2	groundwater
168823		0920	10/18/16	X	X			2	
168831		1030		X	X			2	
168874		1330		X	X			2	
168974		1320		X	X			2	
168149		1400		X	X			2	
168273		1628		X	X			2	
168173		1638		X	X			2	
167649-SW		0950		X	X			2	surface water
129089		1028		X	X			2	ground water



320-22921 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>26</u>		Signature: <u>M. Nadel</u> Time: <u>1100</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: <u>CF Py Fire Tr. Co</u>		COC Seals/Intact? Y/N/NA: <u>=</u>		Printed Name: <u>Marcy Nadel</u> Date: <u>10/19/16</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>RedEx</u>		Received By: 1. Signature: <u>[Signature]</u> Time: <u>0935</u>		Received By: 2. Signature: _____ Time: _____		Received By: 3. Signature: _____ Time: _____	
Sampler: <u>MDN/TKG</u>		(attach shipping bill, if any)		Printed Name: <u>Brian Husong</u> Date: <u>10/21/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Instructions				Company: <u>TAS</u> <u>4.4%</u>		Company: _____		Company: _____	
Requested Turnaround Time: <u>Standard</u>									
Special Instructions: <u>Please notify upon arrival</u>									
Project No: <u>31-1-11735-007/006</u>									
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report									
Yellow - w/shipment - for consignee files									
Pink - Shannon & Wilson - Job File									

No. 34211

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

2358 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 2 of 2

Laboratory: TAT America
Attn: David Alltucker

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

[illegible]

Project Information		Sample Receipt	
Project Number:		Total Number of Containers:	
Project Name:		COC Seals/Intact: Y/N/NA	
Contact:		Received Good Cond./Cold	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method:	
Sampler:		(attach shipping bill, if any)	
Instructions			
Requested Turnaround Time:		Standard	
Special Instructions:		Project No: 31-1-11735-006/07	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File			

No. 34235

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-22921-1

Login Number: 22921

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	
CF C is present.	True	
CF C is filled out in ink and legible.	True	
CF C is filled out with all pertinent information.	True	
Is the Qield Sampler's name present on CF C?	True	
There are no discrepancies between the containers received and the CF C.	True	
Samples are received within Holding Time (including tests with immediate release)	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 reservation Perified.	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 $\leq 6\text{mm H}^2/4\text{"} \times$	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 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:

Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the samples 168823, 168831, 168874, 168974, 168149, 168273, 168173, 147460, LCS (320-135332/2-A), and LCSD (320-135332/3-A). The laboratory notes that quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

The laboratory noted that there was insufficient sample volume to analyze matrix spike (MS) and matrix spike duplicate (MSD) samples for preparation batches 320-134651 and 320-135332.

The laboratory observed that the project samples 64751, 168831, 168874, 168974, 168149, 168273, 168173, 129089, 515493-SW, 147460, and MW-301D exhibited an orange tint and contained some residue on the bottoms of the sample containers.

- 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?

PFCs were not detected in MB 320-135332/1-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 3%.

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 are outside the laboratory limits of 25% to 150% for ¹³C₄-PFHpA, ¹³C₄ PFOA, and/or ¹³C₅ PFNA in the project samples 168823, 168831, 168874 / 168974, 168149, 168173 / 168273, and 147460. IDA recoveries associated with these compounds are above the accepted range by 1% to 22%. Associated project samples were not analyzed at a dilution.

Percent recoveries are also outside laboratory limits for ¹³C₄ PFOA in the LCS sample, and for ¹³C₄-PFHpA, ¹³C₄ PFOA, and ¹³C₅ PFNA in the LCSD sample.

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 PFHpA results for samples 168874 / 168974 and 168149 are considered estimated, no direction of bias, and flagged 'J' in the analytical table. The PFOA results for samples 168831, 168874 / 168974, 168149, 168173 / 168273, and 147460, and the PFNA results for samples 168823 and 168831 are also considered estimated and flagged 'J' in the analytical table.

PFHpA was not detected in sample 168173, therefore this result is considered an estimated non-detection and flagged 'UJ' in the analytical table. PFNA was not detected in samples 168874 / 168974, 168149, 168173 / 168273, and 147460, therefore these results are also considered estimated non-detections and flagged 'UJ' in the analytical table.

Surrogate-recovery failures in laboratory QC samples are not considered to affect the data as long as the recovery of individual analytes associated with that surrogate are within the laboratory control limits. Analyte recoveries were within QC criteria for both the LCS and LCSD samples.

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

Comments:

The data quality for PFNA, PFOA, and/or PFHpA is considered affected by the IDA recovery failures.

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:

The field duplicate pairs 168874 / 168974 and 168173 / 168273 were 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:

The RPD values derived from the field-duplicate pairs "168874 / 168974" and "168173 / 168273" are within acceptance criteria (30% for water samples), where calculable, 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 not affected; see above.

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

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

With the exception of groundwater monitoring well sample MW-301D, reusable equipment was not utilized during sample collection for this work order; therefore an equipment blank was not required. Equipment blanks are analyzed with the appropriate frequency for the project as a whole. An equipment blank was collected as part of the October 17 to October 19 sampling event, and submitted with WO 320-22913.

i. All results less than PQL?

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

An equipment blank was not submitted with this work order.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted with this work order.

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: 320-23068-1

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

Client Project/Site: City of Fairbanks Fire Training Area

Revision: 1

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

11/23/2016 11:40:24 AM

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: 320-23068-1
SDG: 31-1-11735-007

Qualifiers

LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
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
j ro/ectySite: Citf oFkairbangs kire Traininp Area

TestAmerica Job ID: 320-23091-P
SDw: 3P-P-PPv3d-00v

Job ID: 320-23068-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-23068-1

Receipt

The sam6les 5 ere receiMe; on P0y2vy20P9 , :q0 Au . the sam6les arrIME; in poo; con; ition46ro6erlf 6reserMe; an; 45 here re° (ire; 4on ice) The tem6erat(re oFthe cooler at recei6t 5 as P)dz C)

LCMS

u etho; 'sQj kAS: The sam6les 5 ere analf Le; bf the ; irect in/ection metho; Follo5 inp TestAmerica SacramentoR Stan; ar; " 6eratinp j roce; (re 'S" j QWS-" C-002d 8 eM P), 7j erf(orinate; Com6o(n; s 'j kCsQn Water4Soils4Se; iments an; Tiss(eQ

u etho; 'sQj kAS: Isoto6e Dil(tion Analf te 'IDAQrecoMerf is aboMe the metho; recommen; e; limit for the Follo5 inp sam6les: P91q32 '320-23091-PQ P910v9 '320-23091-2Qan; P91Pv9 '320-23091-3Q N(antitation bf isoto6e ; il(tion penerallf 6recl(; es anf a; Merse effect on ; ata °(alitf ; (e to eleMate; IDA recoMerries)

Go a; ; itional analf tical or °(alitf iss(es 5 ere note; 4other than those ; escribe; aboMe or in the Defnitionsywlossarf 6ape)

Organic Prep

u etho; 'sQj kAS j re6: Ins(fficient sam6le Mbl(me 5 as aMailable to 6erform a matrix s6igeymatrix s6ige ; (6licate 'u Syu SDCassociate; 5 ith 6re6aration batch 320-P3ddvv)

Go a; ; itional analf tical or °(alitf iss(es 5 ere note; 4other than those ; escribe; aboMe or in the Defnitionsywlossarf 6ape)

Detection Summary

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

TestAmerica Job ID: 320-23068-1
SDG: 31-1-11735-007

Client Sample ID: 168432

Lab Sample ID: 320-23068-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	15		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	100		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.6		2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	20		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	150		2.0	1.3	ng/L	1			PFAS	Total/NA
Perfluorononanoic acid (PFNA)	1.2	J	2.0	0.65	ng/L	1			PFAS	Total/NA

Client Sample ID: 168076

Lab Sample ID: 320-23068-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.1		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	34		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)	7.2		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	22		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 168176

Lab Sample ID: 320-23068-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.2		2.0	0.92	ng/L	1			PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	37		2.0	0.87	ng/L	1			PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.6	J	2.0	0.80	ng/L	1			PFAS	Total/NA
Perfluorooctanoic acid (PFOA)	7.6		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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23068-1
SDG: 31-1-11735-007

Client Sample ID: 719832

Date Collected: 702871 76:26

Date Received: 702871 0h:80

Lab Sample ID: 320-23019-7

4 atM : x ateM

4 etPw: Faf S - FeMluWWhatec f ly(I Substances

f nal(te	Result	QualifieM	RL	4 DL	Unit	D	FMpaMc	f nal(zec	Dil Aao
FeMluWWhbutanesulWWhio aoic FA) S.	76		2.0	0.92	ng/L		11/02/16 12:34	11/03/16 06:11	1
FeMluWWhPer anesulWWhio aoic FAHr S.	700		2.0	0.87	ng/L		11/02/16 12:34	11/03/16 06:11	1
FeMluWWhPeptanWo aoic FAHpf .	70		2.0	0.80	ng/L		11/02/16 12:34	11/03/16 06:11	1
FeMluWWhbtanWo aoic FA5 f .	20		2.0	0.75	ng/L		11/02/16 12:34	11/03/16 06:11	1
FeMluWWhbtanesulWWhio aoic FA5 S.	760		2.0	1.3	ng/L		11/02/16 12:34	11/03/16 06:11	1
FeMluWWhWhanWo aoic FAJ f .	70 N		2.0	0.65	ng/L		11/02/16 12:34	11/03/16 06:11	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	144		25 - 150	11/02/16 12:34	11/04/16 06:31	1
149: -PFHOp	1: A		25 - 150	11/02/16 12:34	11/04/16 06:31	1
149: PFOp	164 N		25 - 150	11/02/16 12:34	11/04/16 06:31	1
149: PFOS	14A		25 - 150	11/02/16 12:34	11/04/16 06:31	1
149 5 PF7p	162 N		25 - 150	11/02/16 12:34	11/04/16 06:31	1

Client Sample Results

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

TestAmerica Job ID: 320-23068-1
SDG: 31-1-11735-007

Client Sample ID: 7190v1

Date Collected: 702671 0h:66

Date Received: 702671 0h:80

Lab Sample ID: 320-23019-2

4 atM: x ateM

4 etPw: FAf S - FeMluWWhatec f ly(l Substances

f nal(te	Result	QualifieM	RL	4 DL	Unit	D	FMpaMc	f nal(zec	Dil Aao
FeMluWWhbutanesulWWhio aoic FA) S.	60		2.0	0.92	ng/L		11/02/16 12:34	11/03/16 06:30	1
FeMluWWhPer anesulWWhio aoic FAHr S.	38		2.0	0.87	ng/L		11/02/16 12:34	11/03/16 06:30	1
FeMluWWhPeptanWo aoic FAHpf .	70 N		2.0	0.80	ng/L		11/02/16 12:34	11/03/16 06:30	1
FeMluWWhWtanWo aoic FA5 f .	v0		2.0	0.75	ng/L		11/02/16 12:34	11/03/16 06:30	1
FeMluWWhWtanesulWWhio aoic FA5 S.	22		2.0	1.3	ng/L		11/02/16 12:34	11/03/16 06:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/02/16 12:34	11/03/16 06:30	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	141		25 - 150	11/02/16 12:34	11/04/16 06:30	1
149: -PFHOp	1: A		25 - 150	11/02/16 12:34	11/04/16 06:30	1
149: PFOp	162 N		25 - 150	11/02/16 12:34	11/04/16 06:30	1
149: PFOS	1: 4		25 - 150	11/02/16 12:34	11/04/16 06:30	1
149 5 PF7p	166 N		25 - 150	11/02/16 12:34	11/04/16 06:30	1

Client Sample Results

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

TestAmerica Job ID: 320-23068-1
SDG: 31-1-11735-007

Client Sample ID: 7197v1

Date Collected: 702671 0h:86

Date Received: 702671 0h:80

Lab Sample ID: 320-23019-3

4 atM : x ateM

4 etPw: Faf S - FeMluWWhatec f ly(l Substances

f nal(te	Result	QualifieM	RL	4 DL	Unit	D	FMpaMc	f nal(zec	Dil Aao
FeMluWWhbutanesulWWhio aoic FA) S.	6Q		2.0	0.92	ng/L		11/02/16 12:34	11/03/16 06:48	1
FeMluWWhPer anesulWWhio aoic FAHr S.	3v		2.0	0.87	ng/L		11/02/16 12:34	11/03/16 06:48	1
FeMluWWhPeptanWo aoic FAHpf .	7Q N		2.0	0.80	ng/L		11/02/16 12:34	11/03/16 06:48	1
FeMluWWhWtanWo aoic FA5 f .	vQ		2.0	0.75	ng/L		11/02/16 12:34	11/03/16 06:48	1
FeMluWWhWbtanesulWWhio aoic FA5 S.	23		2.0	1.3	ng/L		11/02/16 12:34	11/03/16 06:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		11/02/16 12:34	11/03/16 06:48	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	141		25 - 150	11/02/16 12:34	11/04/16 06:38	1
149: -PFHQp	154	N	25 - 150	11/02/16 12:34	11/04/16 06:38	1
149: PFOp	16A	N	25 - 150	11/02/16 12:34	11/04/16 06:38	1
149: PFOS	1: 2		25 - 150	11/02/16 12:34	11/04/16 06:38	1
149 5 PF7p	1* 2	N	25 - 150	11/02/16 12:34	11/04/16 06:38	1

Isotope Dilution Summary

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

TestAmerica Job ID: 320-23068-1
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 PFO _A (25-150)	¹³ C ₄ PFO _A (25-150)	¹³ C ₅ PFNA (25-150)
320-23068-1	168432	133	149	163 *	139	162 *
320-23068-2	168076	131	149	162 *	143	166 *
320-23068-3	168176	131	153 *	169 *	142	172 *
320-23146-A-2-B MS	Matrix Spike	120	147	180 *	129	198 *
320-23146-A-2-C MSD	Matrix Spike Duplicate	113	149	179 *	122	194 *
LCS 320-135709/2-A	Lab Control Sample	115	133	147	126	146
MB 320-135709/1-A	Method Blank	114	130	141	121	145

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: 320-23068-1
SDG: 31-1-11735-007

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-135709/1-A

Matrix: Water

Analysis Batch: 135810

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 135709

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	. D		2L0	0L92	ng/N		11/02/16 12:3x	11/03/16 00:59	1
Perfluorohexanesulfonic acid (PFpHS)	. D		2L0	0L87	ng/N		11/02/16 12:3x	11/03/16 00:59	1
Perfluorooctanoic acid (PFpOA)	. D		2L0	0L80	ng/N		11/02/16 12:3x	11/03/16 00:59	1
Perfluorooctanoic acid (PF4 A)	. D		2L0	0L75	ng/N		11/02/16 12:3x	11/03/16 00:59	1
Perfluorooctanesulfonic acid (PF4 S)	. D		2L0	1L3	ng/N		11/02/16 12:3x	11/03/16 00:59	1
Perfluorononanoic acid (PF. A)	. D		2L0	0L65	ng/N		11/02/16 12:3x	11/03/16 00:59	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	114		25 - 150	11/02/13 12:64	11/06/13 00:59	1
16C4-PFHpA	160		25 - 150	11/02/13 12:64	11/06/13 00:59	1
16C4 PFOA	141		25 - 150	11/02/13 12:64	11/06/13 00:59	1
16C4 PFOS	121		25 - 150	11/02/13 12:64	11/06/13 00:59	1
16C5 PFNA	145		25 - 150	11/02/13 12:64	11/06/13 00:59	1

Lab Sample ID: LCS 320-135709/2-A

Matrix: Water

Analysis Batch: 135810

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 135709

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	17L7	17Lx		ng/N		98	55 - 1x7
Perfluorohexanesulfonic acid (PFpHS)	18L2	18L8		ng/N		103	58 - 138
Perfluorooctanoic acid (PFpOA)	20L0	20Lx		ng/N		102	63 - 135
Perfluorooctanoic acid (PF4 A)	20L0	20L2		ng/N		101	63 - 1x1
Perfluorooctanesulfonic acid (PF4 S)	18L6	16L3		ng/N		88	x7 - 162
Perfluorononanoic acid (PF. A)	20L0	20Lx		ng/N		102	71 - 1x0

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	115		25 - 150
16C4-PFHpA	166		25 - 150
16C4 PFOA	147		25 - 150
16C4 PFOS	123		25 - 150
16C5 PFNA	143		25 - 150

Lab Sample ID: 320-23146-A-2-B MS

Matrix: Water

Analysis Batch: 135810

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 135709

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	. D		1xL8	18L1		ng/N		123	55 - 1x7
Perfluorohexanesulfonic acid (PFpHS)	. D	F1	15L2	21L1	F1	ng/N		139	58 - 138
Perfluorooctanoic acid (PFpOA)	. D		16L7	21L7		ng/N		130	63 - 135
Perfluorooctanoic acid (PF4 A)	6L3		16L7	29L0		ng/N		135	63 - 1x1
Perfluorooctanesulfonic acid (PF4 S)	1L3	J F1	15L5	25L6	F1	ng/N		165	x7 - 162
Perfluorononanoic acid (PF. A)	. D	F1	16L7	25L8	F1	ng/N		15x	71 - 1x0

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-23068-1
SDG: 31-1-11735-007

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
18O2 PFHxS	120		25 - 150
16C4-PFHpA	147		25 - 150
16C4 PFOA	180	*	25 - 150
16C4 PFOS	129		25 - 150
16C5 PFNA	198	*	25 - 150

Lab Sample ID: 320-23146-A-2-C MSD

Matrix: Water

Analysis Batch: 135810

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 135709

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	. D		1xL7	18L9		ng/N		129	55 - 1x7	x	30
Perfluorohexanesulfonic acid (PFp HS)	. D	F1	15L1	21L1	F1	ng/N		1x0	58 - 138	0	30
Perfluorooctanoic acid (PFp OA)	. D		16L6	21L8		ng/N		131	63 - 135	0	30
Perfluorooctanoic acid (PF4 A)	6L3		16L6	28L3		ng/N		132	63 - 1x1	2	30
Perfluorooctanesulfonic acid (PF4 S)	1L3	J F1	15Lx	2xL0		ng/N		156	x7 - 162	7	30
Perfluorononanoic acid (PF. A)	. D	F1	16L6	2xLx	F1	ng/N		1x7	71 - 1x0	6	30

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
18O2 PFHxS	116		25 - 150
16C4-PFHpA	149		25 - 150
16C4 PFOA	179	*	25 - 150
16C4 PFOS	122		25 - 150
16C5 PFNA	194	*	25 - 150

QC Association Summary

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

TestAmerica Job ID: 320-23068-1
SDG: 31-1-11735-007

LCMS

Prep Batch: 135709

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23068-1	168432	Total/NA	Water	PFAS Prep	
320-23068-2	168076	Total/NA	Water	PFAS Prep	
320-23068-3	168176	Total/NA	Water	PFAS Prep	
MB 320-135709/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-135709/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
320-23146-A-2-B MS	Matrix Spike	Total/NA	Water	PFAS Prep	
320-23146-A-2-C MSD	Matrix Spike Duplicate	Total/NA	Water	PFAS Prep	

Analysis Batch: 135810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23068-1	168432	Total/NA	Water	PFAS	135709
320-23068-2	168076	Total/NA	Water	PFAS	135709
320-23068-3	168176	Total/NA	Water	PFAS	135709
MB 320-135709/1-A	Method Blank	Total/NA	Water	PFAS	135709
LCS 320-135709/2-A	Lab Control Sample	Total/NA	Water	PFAS	135709
320-23146-A-2-B MS	Matrix Spike	Total/NA	Water	PFAS	135709
320-23146-A-2-C MSD	Matrix Spike Duplicate	Total/NA	Water	PFAS	135709

Lab Chronicle

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

TestAmerica Job ID: 320-23068-1
SDG: 31-1-11735-007

Client Sample ID: 872493

Date Collected: 8/26/2016 8:36

Date / Received: 8/27/2016 07:40

Lab Sample ID: 930-39072-8

1 atrIM x ater

Are yBpe	Patch yBpe	Patch 1 ethoW	/ zn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5 zmber	ArepareW or s nalBFeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	135709	11/02/16 12:34	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			135810	11/03/16 06:11	CBW	TAL SAC

Client Sample ID: 8720v7

Date Collected: 8/26/2016 07:66

Date / Received: 8/27/2016 07:40

Lab Sample ID: 930-39072-3

1 atrIM x ater

Are yBpe	Patch yBpe	Patch 1 ethoW	/ zn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5 zmber	ArepareW or s nalBFeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	135709	11/02/16 12:34	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			135810	11/03/16 06:30	CBW	TAL SAC

Client Sample ID: 8728v7

Date Collected: 8/26/2016 07:46

Date / Received: 8/27/2016 07:40

Lab Sample ID: 930-39072-9

1 atrIM x ater

Are yBpe	Patch yBpe	Patch 1 ethoW	/ zn	Dil Nactor	Initial s moz nt	Ninal s moz nt	Patch 5 zmber	ArepareW or s nalBFeW	s nalBut	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	135709	11/02/16 12:34	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			135810	11/03/16 06:48	CBW	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: 320-23068-1
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 Lir Trainin Area

TestAmerica Job ID: 320-23019-7
SDG: 37-7-7753P-005

Method	Method Description	Protocol	Laboratory
LAS	erffkorinatey Alf gl Skbstances	TAd-SAC	TAd SAC

Protocol References:

TAd-SAC = TestAmerica laboratories, West Sacramento, Lacilitg Stanyary Operatinu j roceykre.

Laboratory References:

TAd SAC = TestAmerica Sacramento, 990 8 iversiye j arf wag, West Sacramento, CA 6P10P, TE d (671)353-P100

Sample Summary

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

TestAmerica Job ID: 320-23068-1
SDG: 31-1-11735-007

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23068-1	168432	Water	10/24/16 15:25	10/27/16 09:40
320-23068-2	168076	Water	10/25/16 09:55	10/27/16 09:40
320-23068-3	168176	Water	10/25/16 09:45	10/27/16 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 1 of 1
Laboratory Test America
Attn: David Altucker

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

Sample Identity	Lab No.	Time	Date Sampled	(include preservative if used)						Total Number of Containers	Remarks/Matrix
				Comp.	Grab	XG	PFG	(WGS-IL-0075)			
168432		1525	10/24/16	X	Q					2	Groundwater
439852				X							
168076		0955	10/25/16	X	Q					2	Groundwater
168176		0945	10/25/16	X	Q					2	Groundwater

320-23068 Chain of Custody

Project Information		Sample Receipt	
Project Number: 31-1-11735-007	Total Number of Containers: 6		
Project Name: Reg. Fire Train Cntr	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: FEDEX		
Sampler: TXH1SM4	(attach shipping bill, if any)		
Instructions			
Requested Turnaround Time: Standard			
Special Instructions: Please Notify upon arrival of shipment.			
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: [Signature]	Time: 1030	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: Tiffany Green	Date: 10/26/16	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: Shannon & Wilson.		Company: _____		Company: _____	
Received By: 1.		Received By: 2.		Received By: 3.	
Signature: [Signature]	Time: 0940	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: [Signature]	Date: 10/27/16	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: [Signature]		Company: _____		Company: _____	

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

320-23068 Chain of Custody

No. 34253

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-23068-1

SDG Number: 31-1-11735-007

Login Number: 23068

List Number: 1

Creator: Edman, Connor M

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	
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: Morgan Ripp

Title: Environmental Scientist I Date: November 23, 2016

CS Report Name: City of Fairbanks Fire Training Area Report Date: November 23, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-23068-1 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, 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:

Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the samples 168432, 168076, and 168176. The laboratory notes that quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Insufficient sample volume was available to perform a matrix spike/ matrix spike duplicate (MS/MSD) associated with preparation batch 320-135577.

- c. Were all corrective actions documented?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

The laboratory did not state that 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; refer to Section 6.c. for further assessment.

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; see above.

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 320-135709/1-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 and MS/MSD samples 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 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:

The percent recoveries were within method required 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 were within method required acceptance criteria.

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; see above.

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 in this section.

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 project samples 168432, 168076, and 168176 had IDA recovery failures (biased high) for ¹³C4 PFOA and ¹³C5 PFNA.

The project sample 168176 had an IDA recovery failure (biased high) for ¹³C4-PFHpA.

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 PFOA results for 168432, 168076, and 168176 are considered estimated, no direction of bias, and are flagged 'J*' in the analytical table.

The PFNA result for 168432 is considered estimated, no direction of bias, and is flagged 'J*' in the analytical table. PFNA was not detected in project samples 168076 and 168176 and these results are also considered estimated and are flagged 'J*' in the analytical tables.

The PFHpA result for sample 168176 is considered estimated, no direction of bias, and flagged 'J*' in the analytical table.

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

Yes; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

☐ Yes ☐ No ☒ 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:

The field duplicate pair 168076/168176 was 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:

The RPD values derived from the field-duplicate pair "168076/168176 " is within acceptance criteria (30% for water samples), where calculable, 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 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 work order, therefore 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 work order.

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

Comments:

N/A; an equipment blank was not submitted with this work order.

- 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: 320-23098-1

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:

11/7/2016 10:10:33 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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23098-1

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: 320-23098-1

Job ID: 320-23098-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-23098-1

Receipt

The samples were received on 10/28/2016 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8° 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":

Method(s) PFAS: Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following samples: (320-23146-A-2-A), (320-23146-A-2-B MS) and (320-23146-A-2-C MSD). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method(s) PFAS: The following sample (320-23146-A-2-B MS) and (320-23146-A-2-C MSD) is a Post treatment sample and had a detection for Perfluorooctanoic acid (PFOA), the sample was re-analyzed and PFOA confirmed. The first analysis is 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 320-135577.

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: 320-23098-1

Client Sample ID: 515485

Lab Sample ID: 320-23098-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	8.0		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	25		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 87335

Lab Sample ID: 320-23098-2

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)	11		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: 320-23098-1

Client Sample ID: 515485

Date Collected: 10/24/16 14:26

Date Received: 10/28/16 09:45

Lab Sample ID: 320-23098-1

Matrix: Water

Method: PFAS - Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	8.0		2.0	0.75	ng/L		11/01/16 16:38	11/02/16 18:03	1
Perfluorooctanesulfonic acid (PFOS)	25		2.0	1.3	ng/L		11/01/16 16:38	11/02/16 18:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	132		25 - 150				11/01/16 16:38	11/02/16 18:03	1
13C4 PFOS	114		25 - 150				11/01/16 16:38	11/02/16 18:03	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-23098-1

Client Sample ID: 87335

Date Collected: 10/24/16 12:28

Date Received: 10/28/16 09:45

Lab Sample ID: 320-23098-2

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		11/01/16 16:38	11/02/16 18:22	1
Perfluorooctanesulfonic acid (PFOS)	11		2.0	1.3	ng/L		11/01/16 16:38	11/02/16 18:22	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	139		25 - 150				11/01/16 16:38	11/02/16 18:22	1
13C4 PFOS	116		25 - 150				11/01/16 16:38	11/02/16 18:22	1

Isotope Dilution Summary

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

TestAmerica Job ID: 320-23098-1

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 ₂ (25-150)	3C4 PFO ₃ (25-150)
320-23098-1	515485	132	114
320-23098-2	87335	139	116
LCS 320-135577/2-A	Lab Control Sample	129	113
LCSD 320-135577/3-A	Lab Control Sample Dup	127	108
MB 320-135577/1-A	Method Blank	147	129
Surrogate Legend			
13C4 PFOA = 13C4 PFOA			
13C4 PFOS = 13C4 PFOS			

QC Sample Results

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

TestAmerica Job ID: 320-23098-1

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-135577/1-A

Matrix: Water

Analysis Batch: 135707

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 135577

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		11/01/16 16:38	11/02/16 16:13	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		11/01/16 16:38	11/02/16 16:13	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	147		25 - 150				11/01/16 16:38	11/02/16 16:13	1
13C4 PFOS	129		25 - 150				11/01/16 16:38	11/02/16 16:13	1

Lab Sample ID: LCS 320-135577/2-A

Matrix: Water

Analysis Batch: 135707

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 135577

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	20.1		ng/L		101	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	16.0		ng/L		86	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	129		25 - 150				
13C4 PFOS	113		25 - 150				

Lab Sample ID: LCSD 320-135577/3-A

Matrix: Water

Analysis Batch: 135707

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 135577

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	20.0	26.1		ng/L		130	63 - 141	26	30
Perfluorooctanesulfonic acid (PFOS)	18.6	21.5		ng/L		116	47 - 162	29	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C4 PFOA	127		25 - 150						
13C4 PFOS	108		25 - 150						

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-23098-1

LCMS

Prep Batch: 135577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23098-1	515485	Total/NA	Water	PFAS Prep	
320-23098-2	87335	Total/NA	Water	PFAS Prep	
MB 320-135577/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-135577/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-135577/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 135707

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23098-1	515485	Total/NA	Water	PFAS	135577
320-23098-2	87335	Total/NA	Water	PFAS	135577
MB 320-135577/1-A	Method Blank	Total/NA	Water	PFAS	135577
LCS 320-135577/2-A	Lab Control Sample	Total/NA	Water	PFAS	135577
LCSD 320-135577/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS	135577

Lab Chronicle

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

TestAmerica Job ID: 320-23098-1

Client Sample ID: 878248

Date Collected: 7/26/2017 12:31

Date Received: 7/26/2017 01:28

Lab Sample ID: 930-39014-7

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	135577	11/01/16 16:38	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			135707	11/02/16 18:03	SER	TAL SAC

Client Sample ID: 45998

Date Collected: 7/26/2017 13:34

Date Received: 7/26/2017 01:28

Lab Sample ID: 930-39014-3

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	135577	11/01/16 16:38	ERW	TAL SAC
Total/NA	Analysis	PFAS		1			135707	11/02/16 18:22	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
 j ro/ectySite: Citf oFkairbangs kire Trainind Area

TestAmerica Job ID: 320-23091-P

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
A28A	DoD E8Aj		2921-0P	0P-3P-P7
Alasga (UST)	State j rodram	P0	UST-055	P2-P1-P6
Arizona	State j rodram	9	AZ0701	01-PP-P7
Argansas DE*	State j rodram	6	11-069P	06-P7-P7
Californi	State j rodram	9	2197	0P-3P-P1
Colora. o	State j rodram	1	CA000QQ	01-3P-P7
Connectic4t	State j rodram	P	j u -069P	06-30-P7
klori. a	p E8Aj	Q	E17570	06-30-P7
u aHaii	State j rodram	9	p yA	0P-3P-P7
Illinois	p E8Aj	5	200060	03-P7-P7
wansas	p E8Aj	7	E-P0375	P0-3P-P6 K
8o4isiana	p E8Aj	6	306P2	06-30-P7
Maine	State j rodram	P	CA000Q	0Q-P1-P1
Michidan	State j rodram	5	99Q7	0P-3P-P1
p eva. a	State j rodram	9	CA000QQ	07-3P-P7
p eH Jersef	p E8Aj	2	CA005	06-30-P7
p eH Yorg	p E8Aj	2	PP666	0Q-0P-P7
Oredon	p E8Aj	P0	QQQ	0P-29-P7
j ennsf Ivania	p E8Aj	3	61-0P272	03-3P-P7
Texas	p E8Aj	6	TP0Q70QB99	07-3P-P7
US kish & Wil. lif	ke. eral		8EPQ1311-0	P0-3P-P7
USDA	ke. eral		j 330-PP-00QB6	P2-30-P7
USEj A UCMR	ke. eral	P	CA000QQ	PP-06-P1
Utah	p E8Aj	1	CA000QQ	02-21-P7
Virdinia	p E8Aj	3	Q60271	03-PQ-P7
Washindton	State j rodram	P0	C51P	05-05-P7
West Virdinia (DW)	State j rodram	3	9930C	P2-3P-P6
Wf omind	State j rodram	1	1TMS-8	0P-29-P7

Method Summary

LineSt: h&aSSoS WP iisoS
j ro/ectyhite: I itf oFkairbaSgs kire TraiSiSL Area

TestAmerica Job ID: 320-23091-C

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

Protocol References:

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

Laboratory References:

TAu hAl , TestAmerica hacrameStoO110 Riversi=e j argwaf CP est hacrameStoQ A 95605OTEu (906)373-5600

Sample Summary

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

TestAmerica Job ID: 320-23019-7

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23019-7	575495	Water	70/24/76 74:26	70/29/76 01:45
320-23019-2	98335	Water	70/24/76 72:29	70/29/76 01:45

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: 31-1-11735-008		Total Number of Containers: 4		Signature: [Signature] Time: 1030		Signature: _____ Time: _____		Signature: _____ Time: _____	
Project Name: Reg. Fire Train Ltr.		COC Seals/Intact? Y/N/NA		Printed Name: _____ Date: 10/27/16		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: MDN		Received Good Cond./Cold		Tiffany Green		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Delivery Method: FedEx		Shannon & Wilson		Company: _____		Company: _____	
Sampler: SMH		(attach shipping bill, if any)							
Instructions				Received By: 1.		Received By: 2.		Received By: 3.	
Requested Turnaround Time: Standard				Signature: [Signature] Time: 0945		Signature: _____ Time: _____		Signature: _____ Time: _____	
Special Instructions: Please notify upon arrival.				Printed Name: _____ Date: 10/28/16		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				Wesley Shackley		Company: _____		Company: _____	
				[Signature]		Company: _____		Company: _____	

3.8°C

No. 34256

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-23048-5

Login Number: 23098

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
TaRoadtictiv y asnw dhd' eR or is k4 bad' =rounRas measureRbv a surcev	1rue	
meterg		
1he doolens dustoRv seal. iA, resent. is intadtg	1rue	
Sam, le dustoRv seals. iA, resent. are intadtg	N4	
1he dooler or sam, les Ro not a, , ear to hace been dom, romiseRor	1rue	
tam, ereRy ithg		
Sam, les y ere redeiceR on ideg	1rue	
Cooler 1em, erature is adde, tableg	1rue	
Cooler 1em, erature is redorReRg	1rue	
Cp C is , resentg	1rue	
Cp C is AlleRout in in' anRle=ibleg	1rue	
Cp C is AlleRout y ith all , ertinent inArmationg	1rue	
Q the l ielR Sam, lenw name , resent on Cp CF	1rue	
1here are no Risdre, andies bety een the dontainers redeiceRanR the Cp Cg	1rue	
Sam, les are redeiceRy ithin ? oIRn= 1ime He(dluRn= tests y ith immeRate	1rue	
? 1sx		
Sam, le dontainers hace le=ible labelsg	1rue	
Containers are not bro' en or lea' in=g	1rue	
Sam, le dolledtion Rate4times are , rociReRg	1rue	
f , , ro, riate sam, le dontainers are useRg	1rue	
Sam, le bottles are dom, letelv AlleRg	1rue	
Sam, le) resercation PeriAeRg	N4	
1here is suAdient colgAr all reVuesteR analvses. indlganv reVuesteR	1rue	
q S4q SMs		
Containers reVuirin= Dero heaRs, ade hace no heaRs, ade or bubble is	1rue	
kzmm H56"yg		
q ulti, hasid sam, les are not , resentg	1rue	
Sam, les Ro not reVuire s, littin= or dom, ositin=g	1rue	
TesiRual Chlorine Ched' eRg	N4	

Laboratory Data Review Checklist

Completed by: Morgan Ripp

Title: Environmental Scientist I Date: November 15, 2016

CS Report Name: City of Fairbanks Fire Training Area Report Date: November 07, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: TestAmerica, Inc. Laboratory Report Number: 320-23098-1

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 Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following samples: 320-23146-A-2-A, 320-23146-A-2-B MS, and 320-23146-A-2-C MSD. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

The samples 320-23146-A-2-B MS and 320-23146-A-2-C MSD is a post treatment sample and had a detection for perfluorooctanoic acid (PFOA), the sample was re-analyzed and PFOA confirmed. The first analysis is reported.

There was insufficient volume available to perform a matrix spike/ matrix spike duplicate (MS/MSD) associated with preparatory batch 320-135577.

- 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 320-135577/1-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; see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☒ Yes ☐ No ☐ 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; see above.

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 in this section.

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 reported percent recoveries were within the ranges required by the laboratory method.

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 reported percent recoveries were within the ranges required by the laboratory method.

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

Comments:

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

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☐ Yes ☐ No ☒ 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; see above.

e. Field Duplicate

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

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

A field duplicate was not submitted with this work order. However, field-duplicate samples are submitted with the appropriate frequency for the overall project

- ii. Submitted blind to lab?

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

A field duplicate 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 ☒ NA (Please explain.) Comments:

A field duplicate was not submitted with this work order.

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 work order, therefore 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 work order.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted with this work order.

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.



November 01, 2016

Vista Work Order No. 1601279

Ms. Marcy Nadel
Shannon & Wilson, Inc.
2355 Hill Road
Fairbanks, AK 99709

Dear Ms. Nadel,

Enclosed are the amended results for the sample set received at Vista Analytical Laboratory on October 07, 2016. This sample set was analyzed on a rush turn-around time, under your Project Name 'Reg Fire Tr. Center/31-1-11735'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

A handwritten signature in black ink that reads "Karen Lopez for".

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1601279

Case Narrative

Sample Condition on Receipt:

Three potato samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. As requested, this report has been amended to include the LODs and LOQs on the datasheets.

Analytical Notes:

Modified EPA Method 537

The samples were peeled, and the flesh and skin were extracted and analyzed separately for a selected list of six PFAS using Modified EPA Method 537. The results for PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers. Results for PFHpA and PFNA include the linear isomer only.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above the Reporting Limit. The OPR recoveries were within the method acceptance criteria.

The recoveries of several internal standards in the samples were below the acceptance criteria. The samples were re-extracted and results were similar, suggesting that the recovery issues are due to a matrix effect.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1601279-02	167631-V1L2	VAL - PFAS	13C8-PFOS	H	23.6
1601279-02	167631-V1L2	VAL - PFAS	13C5-PFNA	H	29.3
1601279-04	167631-V2L2	VAL - PFAS	13C8-PFOS	H	28.9
1601279-04	167631-V2L2	VAL - PFAS	13C5-PFNA	H	35.4
1601279-06	167631-V3L2	VAL - PFAS	18O2-PFHxS	H	56.8
1601279-06	167631-V3L2	VAL - PFAS	13C2-PFOA	H	52.3
1601279-06	167631-V3L2	VAL - PFAS	13C8-PFOS	H	26.4
1601279-06	167631-V3L2	VAL - PFAS	13C5-PFNA	H	27.1

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1601279-01	167631-V1L1	06-Oct-16 10:10	07-Oct-16 08:59	Other
1601279-02	167631-V1L2	06-Oct-16 10:10	07-Oct-16 08:59	Other
1601279-03	167631-V2L1	06-Oct-16 10:13	07-Oct-16 08:59	Other
1601279-04	167631-V2L2	06-Oct-16 10:13	07-Oct-16 08:59	Other
1601279-05	167631-V3L1	06-Oct-16 10:20	07-Oct-16 08:59	Other
1601279-06	167631-V3L2	06-Oct-16 10:20	07-Oct-16 08:59	Other

ANALYTICAL RESULTS

Sample ID: Method Blank						VAL - PFAS				
Matrix: Solid	QC Batch: B6J0154 Date Extracted: 25-Oct-2016 17:09					Lab Sample: B6J0154-BLK1				
Sample Size: 1.00 g						Date Analyzed: 28-Oct-16 21:40 Column: BEH C18				
Analyte	Conc. (ng/g)	MDL	LOD	LOQ	Qualifiers	Labeled Standard		%R	LCL-UCL	Qualifiers
PFBS	ND	0.237	0.500	2.00		IS	13C3-PFBS	126	60 - 150	
PFHpA	ND	0.107	0.250	2.00		IS	13C4-PFHpA	103	60 - 150	
PFHxS	ND	0.242	0.500	2.00		IS	18O2-PFHxS	119	60 - 150	
PFOA	ND	0.0605	0.125	2.00		IS	13C2-PFOA	102	60 - 150	
PFOS	ND	0.151	0.500	2.00		IS	13C8-PFOS	119	60 - 150	
PFNA	ND	0.0992	0.250	2.00		IS	13C5-PFNA	113	50 - 150	

MDL - Method detection limit
RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit
The results are reported in dry weight.
The sample size is reported in wet weight.
Results reported to MDL.
When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: OPR					VAL - PFAS			
Matrix:	Solid	QC Batch:	B6J0154		Lab Sample:	B6J0154-BS1		
Sample Size:	1.00 g	Date Extracted:	25-Oct-2016 17:09		Date Analyzed:	28-Oct-16 21:02 Column: BEH C18		
Analyte	Amt Found (ng/g)	Spike Amt	%R	Limits	Labeled Standard		%R	LCL-UCL
PFBS	8.37	10.0	83.7	60 - 130	IS	13C3-PFBS	129	60 - 150
PFHpA	10.0	10.0	100	70 - 130	IS	13C4-PFHpA	107	60 - 150
PFHxS	8.74	10.0	87.4	70 - 130	IS	18O2-PFHxS	123	60 - 150
PFOA	9.72	10.0	97.2	70 - 130	IS	13C2-PFOA	118	60 - 150
PFOS	8.50	10.0	85.0	70 - 130	IS	13C8-PFOS	122	60 - 150
PFNA	9.36	10.0	93.6	50 - 130	IS	13C5-PFNA	116	50 - 150

LCL-UCL - Lower control limit - upper control limit

Sample ID: Method Blank						VAL - PFAS			
Matrix: Solid		QC Batch: B6J0161				Qa7 Sample: B6J01614BOA1			
Sample Size: 1u00 H		Date Extracted: 5642 ct45016 1- :06				Date 9 Lalbzde: 5n42 ct4l6 5l:y5 ColKmL: BE8 C1n			
Analyte	Conc. (ng/g)	MDL	LOD	LOQ	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
. gBS	P D	0u5FN	0uy00	5u00		IS 1FCF4 gBS	105	60 41y0	
. g8 p9	P D	0u40N	0u5y0	5u00		IS 1FC- 4 g8 p9	101	60 41y0	
. g8 xS	P D	0u5- 5	0uy00	5u00		IS 1n2 54 g8 xS	3nuy	60 41y0	
. g2 9	P D	0u060y	0u45y	5u00		IS 1FC54 g2 9	n3u8	60 41y0	
. g2 S	P D	0u4 y1	0uy00	5u00		IS 1FCn4 g2 S	nN6	60 41y0	
. gP9	P D	0u0335	0u5y0	5u00		IS 1FCy4 gP9	n3u5	y0 41y0	

MDO4Method detectioL limit
RO4ReportiLHlimit

OCO4UCO4Oower coLtrol limit 4Kpper coLtrol limit
The resKIts are reported iL drb weiHtu
The sample size is reported iL wet weiHtu
ResKIts reported to MDOu
WheL reported, . gBS, . g8 xS, . g2 9 aLd . g2 S iLclKde 7oth liLear aLd 7raLched isomersu
2 LlB the liLear isomer is reported for all other aLalbtesu

Sample ID: OPR					VAL - PFAS			
Matrix: Solid		QC Batch: B6J0161			Qa7 Sample: B6J01614BS1			
Sample Size: 1800 u		Date Extracted: 5642 ct45016 1-:06			Date 9 Labzed: 5A42 ct4l6 51:1- ColnmL: BEy C1A			
Analyte	Amt Found (ng/g)	Spike Amt	%R	Limits	Labeled Standard		%R	LCL-UCL
H BS	P8F	1080	PP8F	60 41g0	IS	1gCg4H BS	P38F	60 41F0
H y p9	118F	1080	11F	30 41g0	IS	1gC- 4H y p9	10F	60 41F0
H y xS	1080	1080	100	30 41g0	IS	1A2 54H y xS	PP8P	60 41F0
H 2 9	158g	1080	15g	30 41g0	IS	1gC54H 2 9	AA8g	60 41F0
H 2 S	1180	1080	110	30 41g0	IS	1gCA4H 2 S	P38	60 41F0
H N9	1588	1080	153	F0 41g0	IS	1gCF4H N9	A588	F0 41F0

OCO4UCO4Oower coLtrol limit 4npper coLtrol limit

Sample ID: 167631-V1L1							VAL - PFAS		
Client Data			Sample Data		Laboratory Data				
Name:	Shannon & Wilson, Inc.		Matrix:	Solid	Lab Sample:	1601279-01	Date Received:	07-Oct-2016	8:59
Project:	Reg Fire Tr. Center/31-1-11735		Sample Size:	0.733 g	QC Batch:	B6J0161	Date Extracted:	26-Oct-2016	14:06
Date Collected:	06-Oct-2016 10:10		% Solids:	14.5	Date Analyzed:	28-Oct-16 22:43	Column:	BEH C18	
Location:	Outer layer (skin)								
Analyte	Conc. (ng/g)	MDL	LOD	LOQ	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
PFBS	ND	2.22	4.69	18.8		IS 13C3-PFBS	148	60 - 150	
PFHpA	ND	1.00	2.34	18.8		IS 13C4-PFHpA	77.3	60 - 150	
PFHxS	ND	2.27	4.69	18.8		IS 18O2-PFHxS	93.2	60 - 150	
PFOA	ND	0.567	1.17	18.8		IS 13C2-PFOA	92.8	60 - 150	
PFOS	ND	1.42	4.69	18.8		IS 13C8-PFOS	75.4	60 - 150	
PFNA	ND	0.930	2.34	18.8		IS 13C5-PFNA	78.7	50 - 150	

MDL - Method detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight.

The sample size is reported in wet weight.

Results reported to MDL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: 167631-V1L2							VAL - PFAS		
Client Data			Sample Data		Laboratory Data				
Name:	Shannon & Wilson, Inc.		Matrix:	Solid	Lab Sample:	1601279-02	Date Received:	07-Oct-2016	8:59
Project:	Reg Fire Tr. Center/31-1-11735		Sample Size:	1.10 g	QC Batch:	B6J0161	Date Extracted:	26-Oct-2016	14:06
Date Collected:	06-Oct-2016 10:10		% Solids:	24.3	Date Analyzed:	28-Oct-16 22:55	Column:	BEH C18	
Location:	Inner layer (flesh)								
Analyte	Conc. (ng/g)	MDL	LOD	LOQ	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
PFBS	ND	0.883	1.86	7.45		IS 13C3-PFBS	128	60 - 150	
PFHpA	ND	0.399	0.931	7.45		IS 13C4-PFHpA	71.6	60 - 150	
PFHxS	ND	0.902	1.86	7.45		IS 18O2-PFHxS	71.7	60 - 150	
PFOA	ND	0.225	0.466	7.45		IS 13C2-PFOA	60.6	60 - 150	
PFOS	ND	0.563	1.86	7.45		IS 13C8-PFOS	23.6	60 - 150	H
PFNA	ND	0.370	0.931	7.45		IS 13C5-PFNA	29.3	50 - 150	H

MDL - Method detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight.

The sample size is reported in wet weight.

Results reported to MDL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: 167631-V2L1						VAL - PFAS				
Client Data			Sample Data			Laboratory Data				
Name: Sha33R3 & WilsR3, I3c.			Matrix: SRId			n ay Sample: 1601CbA40H		Date 5 ecei9ed: 0b4L.ct40016 u:2A		
PrRject: 5 eg Fire Tr. Ce3ter/Hl4l4l1bH2			Sample Size: 0.b2Hg			QC Batch: B6J012-		Date Extracted: 024L.ct40016 1b:0A		
Date CRllected: 064L.ct40016 10:1H			% SRlids: 1HO			Date 8 3alozed: Qn4L.ct4l6 CH-6 CRlvm3: BE7 C1u				
nRcatiR3: L vter laoeR (ski3)										
Analyte	Conc. (ng/g)	MDL	LOD	LOQ	Qualifiers	Labeled Standard		%R	LCL-UCL	Qualifiers
PFBS	ND	QHA	2.0H	00.1		IS 1HCH4PFBS		10-	60 4 120	
PF7 p8	ND	1.0u	Q2O	00.1		IS 1HC- 4PF7 p8		AAu	60 4 120	
PF7 xS	ND	Q- -	2.0H	00.1		IS 1uL O4PF7 xS		1CH	60 4 120	
PFL 8	ND	0.60A	1.06	00.1		IS 1HCO4PFL 8		100	60 4 120	
PFLS	ND	1.2O	2.0H	00.1		IS 1HCu4PFLS		10-	60 4 120	
PFN8	ND	0.AAA	Q2O	00.1		IS 1HC24PFN8		At.6	20 4 120	

MDn 4MethRd detectiR3 limit
5 n 45 epRti3g limit

nCn4UCn 4nRwer cR3trRl limit 4vpper cR3trRl limit
The resvltS are repRrted i3 dro weight.
The sample size is repRrted i3 wet weight.
5 esvltS repRrted tRMDn.
Whe3 repRrted, PFBS, PF7 xS, PFL 8 a3d PFLS i3clvde yRth li3ear a3d yra3ched isRmers.
L 3lo the li3ear isRmer is repRrted fRr all Rther a3alotes.

Sample ID: 167631-V2L2					VAL - PFAS				
Client Data			Sample Data		Laboratory Data				
P ame: Shannon W s il, onl .ncg			Matrix: Solid		Lab Sample: 160127N04		Date Received: 07-Oct-2016 8:9N		
j ro&ct: ReF Tire / rgCenter31-1-11759			Sample Size: 1g5 F		QC Batch: B6J0161		Date Extracted: 26-Oct-2016 14:06		
Date Collected: 06-Oct-2016 10:15			% Solid,: 26g		Date Analyzed: 28-Oct-16 25:08 Column: BEH C18				
Location: .nner layer (fle,h)									
Analyte	Conc. (ng/g)	MDL	LOD	LOQ	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
j TBS	P D	0g84	1g7	7g6		.S 15C5-j TBS	N7g	60 - 190	
j THpA	P D	0gNN	0g55	7g6		.S 15C4-j THpA	6Ng	60 - 190	
j THxS	P D	0g05	1g7	7g6		.S 18O2-j THxS	71g	60 - 190	
j TOA	P D	0g26	0g66	7g6		.S 15C2-j TOA	60g	60 - 190	
j TOS	P D	0g65	1g7	7g6		.S 15C8-j TOS	28gN	60 - 190	H
j TP A	P D	0g70	0g55	7g6		.S 15C9-j TP A	59g	90 - 190	H

MDL - Method detection limit
RL - ReportinF limit

LCL-UCL - Lower control limit - upper control limit
/ he re, ult, are reported in dry weiFhtg
/ he ,ample , ize i, reported in wet weiFhtg
Re, ult, reported to MDLg
s hen reportedI j TBSIj THxSIj TOA and j TOS include both linear and branched i, omer, g
Only the linear i, omer i, reported for all other analyte, g

Sample ID: 167631-V3L1							VAL - PFAS		
Client Data			Sample Data		Laboratory Data				
Name:	Shannon & Wilson, Inc.		Matrix:	Solid	Lab Sample:	1601279-05	Date Received:	07-Oct-2016	8:59
Project:	Reg Fire Tr. Center/31-1-11735		Sample Size:	0.753 g	QC Batch:	B6J0161	Date Extracted:	26-Oct-2016	14:06
Date Collected:	06-Oct-2016 10:20		% Solids:	17.0	Date Analyzed:	28-Oct-16 23:20	Column:	BEH C18	
Location:	Outer layer (skin)								
Analyte	Conc. (ng/g)	MDL	LOD	LOQ	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
PFBS	ND	1.85	3.91	15.6		IS 13C3-PFBS	93.9	60 - 150	
PFHpA	ND	0.837	1.96	15.6		IS 13C4-PFHpA	74.0	60 - 150	
PFHxS	ND	1.89	3.91	15.6		IS 18O2-PFHxS	90.2	60 - 150	
PFOA	ND	0.473	0.978	15.6		IS 13C2-PFOA	90.5	60 - 150	
PFOS	ND	1.18	3.91	15.6		IS 13C8-PFOS	73.8	60 - 150	
PFNA	ND	0.776	1.96	15.6		IS 13C5-PFNA	79.6	50 - 150	

MDL - Method detection limit

RL - Reporting limit

LCL-UCL - Lower control limit - upper control limit

The results are reported in dry weight.

The sample size is reported in wet weight.

Results reported to MDL.

When reported, PFBS, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes.

Sample ID: 167631-V3L2						VAL - PFAS			
Client Data P ame: Shannon W s il, onl .ncg j ro&ct: ReF Tire / rgCenter31-1-11759 Date Collected: 06-Oct-2016 10:20 Location: .nner layer (fle, h)			Sample Data Matrix: Solid Sample Size: 1g5 F % Solid,: 21g		Laboratory Data Lab Sample: 160127N06 Date Received: 07-Oct-2016 8:9N QC Batch: B6J0161 Date Extracted: 26-Oct-2016 14:06 Date Analyzed: 28-Oct-16 25:55 Column: BEH C18				
Analyte	Conc. (ng/g)	MDL	LOD	LOQ	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
j TBS	P D	1g6	2g5	8g5		.S 15C5-j TBS	101	60 - 190	
j THpA	P D	0g478	1g2	8g5		.S 15C4-j THpA	64g	60 - 190	
j THxS	P D	1g8	2g5	8g5		.S 18O2-j THxS	96g	60 - 190	H
j TOA	P D	0g270	0g98	8g5		.S 15C2-j TOA	92g	60 - 190	H
j TOS	P D	0g674	2g5	8g5		.S 15C8-j TOS	26g	60 - 190	H
j TP A	P D	0g445	1g2	8g5		.S 15C9-j TP A	27g	90 - 190	H

MDL - Method detection limit
 RL - ReportinF limit

LCL-UCL - Lower control limit - upper control limit
 / he re, ult, are reported in dry weiFhtg
 / he ,ample , ize i, reported in wet weiFhtg
 Re, ult, reported to MDLg
 s hen reportedI j TBSIj THxSIj TOA and j TOS include both linear and branched i, omer, g
 Only the linear i, omer i, reported for all other analyte, g

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank.
D	Dilution
E	The associated compound concentration exceeded the calibration range of the instrument.
H	Recovery and/or RPD was outside laboratory acceptance limits.
I	Chemical Interference
J	The amount detected is below the Reporting Limit/LOQ.
*	See Cover Letter
Conc.	Concentration
NA	Not applicable
ND	Not Detected
TEQ	Toxic Equivalency

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2014022
Nevada Division of Environmental Protection	CA004132015-1
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-004
Pennsylvania Department of Environmental Protection	012
South Carolina Department of Health	87002001
Texas Commission on Environmental Quality	T104704189-15-6
Virginia Department of General Services	7923
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope	EPA 1613B

Dilution GC/HRMS	
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

1601279, 7.3



SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

CHAIN-OF-CUSTODY RECORD

Laboratory Vista Analytical Page 1 of 1
Attn: _____

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

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

2250 S.W. Canyon Road
Portland, OR 97201-2486
(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) 946-6308

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

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	FFS (UG UHP)						Total Number of Containers	Remarks/Matrix
167631-V14		1010	10/6/16	X	X							1	outer layer (skin)
167631-V12		1010		X	X							1	inner layer (flesh)
167631-V24		1013		X	X							1	outer layer (skin)
167631-V22		1013		X	X							1	inner layer (flesh)
167631-V34		1020		X	X							1	outer layer (skin)
167631-V32		1020		X	X							1	inner layer (flesh)

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>3</u>	COC Seals/Intact? Y/N/NA		Signature: <u>[Signature]</u>	Time: <u>1100</u>	Signature: _____	Time: _____	Signature: _____	Time: _____
Project Name: <u>Reg Fire Tr. Center</u>	Received Good Cond./Cold			Printed Name: <u>Marcy Nadel</u>	Date: <u>10/6/16</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Contact: <u>Marcy Nadel</u>	Delivery Method: <u>Fed Ex</u>			Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	(attach shipping bill, if any)								
Sampler: <u>MDN</u>									
Instructions		Received By: 1.		Received By: 2.		Received By: 3.			
Requested Turnaround Time: <u>Standard</u>		Signature: <u>[Signature]</u>	Time: <u>0957</u>	Signature: _____	Time: _____	Signature: _____	Time: _____		
Special Instructions: <u>Please notify upon arrival</u>		Printed Name: <u>Desiree Jackman</u>	Date: <u>10/7/16</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____		
		Company: <u>VAL</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

SAMPLE LOG-IN CHECKLIST



Vista Project #: 1601279

TAT ~~SP~~ 21 Std
10/10/16

Samples Arrival:	Date/Time 10/7/16 0859	Initials: SR df	Location: WR-2
			Shelf/Rack: N/A
Logged In:	Date/Time 10/10/16 1216	Initials: SR [Signature]	Location: WR-2
			Shelf/Rack: C7
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac
		<input type="radio"/> DHL	<input type="radio"/> Hand Delivered
Other			
Preservation:	<input type="radio"/> Ice	<input checked="" type="radio"/> Blue Ice	<input type="radio"/> Dry Ice
			<input type="radio"/> None
Temp °C: 7.6 (uncorrected)	Time: 0956		Thermometer ID: IR-1
Temp °C: 7.3 (corrected)	Probe used: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		

	YES	NO	NA
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>		
Holding Time Acceptable?	<input checked="" type="checkbox"/>		
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>		
Shipping Custody Seals Intact?	<input checked="" type="checkbox"/>		
Shipping Documentation Present?	<input checked="" type="checkbox"/>		
Airbill			
Trk # 7774 1056 0181	<input checked="" type="checkbox"/>		
Sample Container Intact?	<input checked="" type="checkbox"/>		
Sample Custody Seals Intact?			<input checked="" type="checkbox"/>
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>		
COC Anomaly/Sample Acceptance Form completed?		<input checked="" type="checkbox"/>	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			<input checked="" type="checkbox"/>
Preservation Documented:	Na ₂ S ₂ O ₃	Trizma	Yes No NA
Shipping Container	Vista	Client	Retain Return Dispose

Comments: Received 3 potatoes

Laboratory Data Review Checklist

Completed by: Marcy Nadel

Title: Geologist Date: November 01, 2016

CS Report Name: City of Fairbanks Fire Training Area Report Date: November 01, 2016

Consultant Firm: Shannon & Wilson, Inc.

Laboratory Name: Vista Analytical Laboratory Report Number: 1601279_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 does not provide approval for the recommended analysis. However, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) for the analysis of perfluorinated compounds (PFCs) by modifications to EPA Method 537 for various matrices (biological tissues, drinking water, non-potable water, and solids). The current method is a modification to accommodate for the analysis of vegetable samples. The laboratory is not accredited for this specific modified EPA Method 537.

- 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 Vista Analytical Laboratory in El Dorado Hills, 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 method requires that "sample temperature must be confirmed to be at or below 10°C when the samples are received at the laboratory" for solid and tissue samples. The samples were received within acceptable temperature limits.

- 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 to note by the laboratory.

- 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 case narrative noted that the recoveries of several internal-standards in the samples were below the acceptance criteria.

- c. Were all corrective actions documented?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

The samples were re-extracted to confirm the initial results; the results were confirmed with similar internal-standard recovery failures. This suggests that the internal-standard recovery issues are due to a matrix effect.

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

Comments:

The re-extracted results are reported. The laboratory report includes qualifiers for those analyses where internal standards do not meet QC criteria. Refer to Section 6.c. for further assessment.

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:

c. All soils reported on a dry weight basis?

☒ Yes ☐ No ☐ NA (Please explain.)

Comments:

Vegetable or tissue sample results are reported in dry weight. 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:

There are no cleanup levels or minimum required detection levels for PFOS or PFOA in vegetables. The PQL is equivalent to the laboratory Reporting Limit (RL), which ranges from 7.45 ng/g to 20.01 ng/g.

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:

The target analytes were not detected in the method blank samples.

iii. If above PQL, what samples are affected?

Comments:

N/A; the target analytes were not detected in the 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:

The target analytes were not detected in the method blank samples; 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:

An LCS, equivalent to the laboratories Ongoing Precision and Recovery (OPR) sample, was analyzed for this WO. An LCSD was not analyzed. We have no measure of laboratory precision.

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, for both the LCS associated with the initial analysis and the re-extraction analysis.

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:

An LCSD was not reported, therefore RPDs cannot be calculated.

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

Comments:

N/A; percent recoveries 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 modified EPA Method 537 entails adding an isotopically labeled compound of each target analyte and assessing the recovery of these compounds. The isotopically labeled compounds are internal-standards and will be discussed in this section.

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 are within the laboratory limits, with some exceptions.

The internal-standard recoveries for PFOS and PFNA did not meet QC criteria (biased low) for samples "167631-V1L2" and "167631-V2L2."

The internal-standard recoveries for PFHxS, PFOA, PFOS, and PFNA did not meet QC criteria (biased low) for sample "167631-V3L2."

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 project analytes were not detected in the project samples. These sample results are considered estimated and are flagged 'UJ' due to low surrogate recovery.

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

Comments:

Yes, the PFC results associated with low surrogate recovery are qualified; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

PFCs are not volatile compounds; a trip blank is not required for this analysis.

- 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 analysis; see above.

- iii. All results less than PQL?

☐ Yes ☐ No ☒ NA (Please explain.)

Comments:

A trip blank was not required for this analysis.

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

Comments:

A trip blank was not required this analysis.

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

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 ☐ NA (Please explain.)

Comments:

A field duplicate was not submitted with these samples. Vegetable samples were peeled and separated by the laboratory; due to the nature of this analysis it would not be possible to submit a 'blind' field duplicate pair.

- 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.

- 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.

- 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 work order, therefore 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 work order.

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

Comments:

N/A; an equipment blank was not submitted with this work order.

- 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: 320-23394-1

TestAmerica Sample Delivery Group: 31-1-11735

Client Project/Site: City of Fairbanks Fire Training Area

Revision: 1

For:

Shannon & Wilson

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel



Authorized for release by:

11/23/2016 11:37:30 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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23394-1
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
Project/Site: City of Fairbanks Fire Training Area

TestAmerica Job ID: 320-23394-1
SDG: 31-1-11735

Job ID: 320-23394-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-23394-1

Receipt

The samples were received on 11/9/2016 9:20 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. 1.9 "Perfluorinated Compounds (PFCs) in Water, Soils, Sediments and Tissue":

Method(s) PFAS: Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following sample: (320-23310-A-9-A). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

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: Samples 23310-7 and 23310-8 are a orange color and sample 23393-B-2 has a yellow color. 95630 (320-23394-2)

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

Detection Summary

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

TestAmerica Job ID: 320-23394-1
SDG: 31-1-11735

Client Sample ID: 526576

Lab Sample ID: 320-23394-1

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)	33		2.0	1.3	ng/L	1			PFAS	Total/NA

Client Sample ID: 95630

Lab Sample ID: 320-23394-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.6		2.0	0.75	ng/L	1			PFAS	Total/NA
Perfluorooctanesulfonic acid (PFOS)	18		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: 320-23394-1
SDG: 31-1-11735

Client Sample ID: 5245M4

Date Collected: 10/25/14 13:30

Date Received: 11/09/14 09:20

Lab Sample ID: 320-23398-1

retrieved at

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyze	Dil Factor
Perfluorooctanoic acid (PFOA)	3.8		2.0	0.75	ng/L		11/11/16 15:46	11/15/16 21:58	1
Perfluorooctanesulfonic acid (PFOS)	33		2.0	1.3	ng/L		11/11/16 15:46	11/15/16 21:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
¹³ C4 PFOA	136		25 - 150				11/11/16 15:46	11/15/16 21:58	1
¹³ C4 PFOS	123		25 - 150				11/11/16 15:46	11/15/16 21:58	1

Client Sample Results

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

TestAmerica Job ID: 320-23394-1
SDG: 31-1-11735

Client Sample ID: 95430

Date Collected: 11/09/14 18:30

Date Received: 11/09/14 09:20

Lab Sample ID: 320-23398-2

Requested by: Shannon & Wilson

Perfluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil Factor
Perfluorooctanoic acid (PFOA)	3.4		2.0	0.75	ng/L		11/11/16 16:15	11/15/16 14:56	1
Perfluorooctanesulfonic acid (PFOS)	17		2.0	1.3	ng/L		11/11/16 16:15	11/15/16 14:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Factor
¹³ C4 PFOA	140		25 - 150				11/11/16 16:15	11/15/16 14:56	1
¹³ C4 PFOS	118		25 - 150				11/11/16 16:15	11/15/16 14:56	1

Isotope Dilution Summary

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

TestAmerica Job ID: 320-23394-1
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)
320-23249-B-3-E MS	Matrix Spike	144	133
320-23249-B-3-F MSD	Matrix Spike Duplicate	135	126
320-23310-A-9-B MS	Matrix Spike	144	125
320-23310-A-9-C MSD	Matrix Spike Duplicate	136	118
320-23394-1	526576	136	123
320-23394-2	95630	140	118
LCS 320-137421/2-A	Lab Control Sample	146	139
LCS 320-137425/2-A	Lab Control Sample	139	123
MB 320-137421/1-A	Method Blank	99	92
MB 320-137425/1-A	Method Blank	129	112
Surrogate Legend			
13C4 PFOA = 13C4 PFOA			
13C4 PFOS = 13C4 PFOS			

QC Sample Results

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

TestAmerica Job ID: 320-23394-1
SDG: 31-1-11735

Method: PFAS - Perfluorinated Alkyl Substances

Lab Sample ID: MB 320-137421/1-A

Matrix: Water

Analysis Batch: 137566

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 137421

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		11/11/16 15:46	11/14/16 09:35	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		11/11/16 15:46	11/14/16 09:35	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	99		25 - 150				11/11/16 15:46	11/14/16 09:35	1
13C4 PFOS	92		25 - 150				11/11/16 15:46	11/14/16 09:35	1

Lab Sample ID: LCS 320-137421/2-A

Matrix: Water

Analysis Batch: 137566

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 137421

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	21.1		ng/L		106	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	16.5		ng/L		89	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	146		25 - 150				
13C4 PFOS	139		25 - 150				

Lab Sample ID: 320-23249-B-3-E MS

Matrix: Water

Analysis Batch: 137566

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 137421

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	ND		16.9	17.1		ng/L		101	63 - 141
Perfluorooctanesulfonic acid (PFOS)	ND		15.7	13.8		ng/L		88	47 - 162
Isotope Dilution	%Recovery	MS Qualifier	Limits						
13C4 PFOA	144		25 - 150						
13C4 PFOS	133		25 - 150						

Lab Sample ID: 320-23249-B-3-F MSD

Matrix: Water

Analysis Batch: 137566

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 137421

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	ND		17.2	17.2		ng/L		100	63 - 141	0	30
Perfluorooctanesulfonic acid (PFOS)	ND		15.9	14.3		ng/L		90	47 - 162	4	30
Isotope Dilution	%Recovery	MSD Qualifier	Limits								
13C4 PFOA	135		25 - 150								
13C4 PFOS	126		25 - 150								

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-23394-1
SDG: 31-1-11735

Method: PFAS - Perfluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-137425/1-A

Matrix: Water

Analysis Batch: 137773

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 137425

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		11/11/16 16:15	11/15/16 07:54	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		11/11/16 16:15	11/15/16 07:54	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	129		25 - 150				11/11/16 16:15	11/15/16 07:54	1
13C4 PFOS	112		25 - 150				11/11/16 16:15	11/15/16 07:54	1

Lab Sample ID: LCS 320-137425/2-A

Matrix: Water

Analysis Batch: 137773

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 137425

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	20.0	21.6		ng/L		108	63 - 141
Perfluorooctanesulfonic acid (PFOS)	18.6	17.2		ng/L		93	47 - 162
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C4 PFOA	139		25 - 150				
13C4 PFOS	123		25 - 150				

Lab Sample ID: 320-23310-A-9-B MS

Matrix: Water

Analysis Batch: 137773

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Prep Batch: 137425

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanoic acid (PFOA)	ND		17.6	17.8		ng/L		101	63 - 141
Perfluorooctanesulfonic acid (PFOS)	ND		16.4	14.6		ng/L		89	47 - 162
Isotope Dilution	%Recovery	MS Qualifier	Limits						
13C4 PFOA	144		25 - 150						
13C4 PFOS	125		25 - 150						

Lab Sample ID: 320-23310-A-9-C MSD

Matrix: Water

Analysis Batch: 137773

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 137425

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	ND		18.1	17.7		ng/L		98	63 - 141	1	30
Perfluorooctanesulfonic acid (PFOS)	ND		16.8	14.6		ng/L		87	47 - 162	0	30
Isotope Dilution	%Recovery	MSD Qualifier	Limits								
13C4 PFOA	136		25 - 150								
13C4 PFOS	118		25 - 150								

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-23394-1
SDG: 31-1-11735

LCMS

Prep Batch: 137421

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23394-1	526576	Total/NA	Water	PFAS Prep	
MB 320-137421/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-137421/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
320-23249-B-3-E MS	Matrix Spike	Total/NA	Water	PFAS Prep	
320-23249-B-3-F MSD	Matrix Spike Duplicate	Total/NA	Water	PFAS Prep	

Prep Batch: 137425

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23394-2	95630	Total/NA	Water	PFAS Prep	
MB 320-137425/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-137425/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
320-23310-A-9-B MS	Matrix Spike	Total/NA	Water	PFAS Prep	
320-23310-A-9-C MSD	Matrix Spike Duplicate	Total/NA	Water	PFAS Prep	

Analysis Batch: 137566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-137421/1-A	Method Blank	Total/NA	Water	PFAS	137421
LCS 320-137421/2-A	Lab Control Sample	Total/NA	Water	PFAS	137421
320-23249-B-3-E MS	Matrix Spike	Total/NA	Water	PFAS	137421
320-23249-B-3-F MSD	Matrix Spike Duplicate	Total/NA	Water	PFAS	137421

Analysis Batch: 137773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23394-2	95630	Total/NA	Water	PFAS	137425
MB 320-137425/1-A	Method Blank	Total/NA	Water	PFAS	137425
LCS 320-137425/2-A	Lab Control Sample	Total/NA	Water	PFAS	137425
320-23310-A-9-B MS	Matrix Spike	Total/NA	Water	PFAS	137425
320-23310-A-9-C MSD	Matrix Spike Duplicate	Total/NA	Water	PFAS	137425

Analysis Batch: 138032

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23394-1	526576	Total/NA	Water	PFAS	137421

Lab Chronicle

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

TestAmerica Job ID: 320-23394-1
SDG: 31-1-11735

Client Sample ID: 526576

Date Collected: 10/25/16 13:30

Date Received: 11/09/16 09:20

Lab Sample ID: 320-23394-1

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 mL	1.66 mL	137421	11/11/16 15:46	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			138032	11/15/16 21:58	SER	TAL SAC

Client Sample ID: 95630

Date Collected: 11/07/16 14:40

Date Received: 11/09/16 09:20

Lab Sample ID: 320-23394-2

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 mL	1.66 mL	137425	11/11/16 16:15	VPM	TAL SAC
Total/NA	Analysis	PFAS		1			137773	11/15/16 14:56	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: 320-23368-1
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		2629-01	01-31-17
Alaska (UST)	State Program	10	UST-055	12-19-1z
Arizona	State Program	6	AQ0709	09-11-17
Arkansas DE4	State Program	z	99-0z61	0z-17-17
California	State Program	6	2967	01-31-19
Colorado	State Program	9	CA00088	09-31-17
Connecticut	State Program	1	PH-0z61	0z-30-17
Florida	NELAP	8	E97570	0z-30-17
Hawaii	State Program	6	N/A	01-31-17
Illinois	NELAP	5	2000z0	03-17-17
Kansas	NELAP	7	E-10375	10-31-17
Louisiana	NELAP	z	30z12	0z-30-17
Maine	State Program	1	CA0008	08-19-19
Michigan	State Program	5	6687	01-31-19
Nevada	State Program	6	CA00088	07-31-17
New Jersey	NELAP	2	CA005	0z-30-17
New York	NELAP	2	11zzz	08-01-17
Oregon	NELAP	10	8080	01-26-17
Pennsylvania	NELAP	3	z9-01272	03-31-17
Texas	NELAP	z	T108708366	07-31-17
US Fish & Wildlife	Federal		LE189399-0	10-31-17
USDA	Federal		P330-11-0083z	12-30-17
USEPA UCMR	Federal	1	CA00088	11-0z-19
Utah	NELAP	9	CA00088	02-29-17
Virginia	NELAP	3	8z0279	03-18-17
Washington	State Program	10	C591	05-05-17
West Virginia (DW)	State Program	3	6630C	12-31-1z
Wyoming	State Program	9	9TMS-L	01-26-17

Method Summary

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

TestAmerica Job ID: 320-23394-1
SDG: 31-1-11735

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: 320-23394-1
SDG: 31-1-11735

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23394-1	526576	Water	10/25/16 13:30	11/09/16 09:20
320-23394-2	95630	Water	11/07/16 14:40	11/09/16 09:20



2255 S.W. Canyon Road
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Denver, CO 80204
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2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Page 1 of 1
Laboratory Test America
Attn: David Altrucker

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: Reg. Fire Tr. Center	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: FedEx		
Sampler: HDP/SMH	(attach shipping bill, if any)		
Instructions			
Requested Turnaround Time: Standard			
Special Instructions: Bill to 31-1-11735-008			
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: M. Nadel	Time: 1000	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: Marcy Nadel	Date: 11/8/16	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: Shannon & Wilson		Company: _____		Company: _____	
Received By: 1.		Received By: 2.		Received By: 3.	
Signature: [Signature]	Time: 0920	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: [Name]	Date: 11/8/16	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: [Company]		Company: _____		Company: _____	

F-19-91/UR

No. 34268

Login Sample Receipt Checklist

Client: Shannon & Wilson

Job Number: 320-23319-7

SDG Number: 37-7-7753T

Login Number: 23394

List Source: TestAmerica Sacramento

List Number: 1

Creator: Edman, Connor M

Question	Answer	Comment
d acioavtiytw' asnlk vhev<ec or is / æ bav<. rounc as measurec bwa suryew meter,	Rue	
Rhe voolerls vustocwsealf ipAresentf is intavt,	Rue	
SamAle vustocwsealsf ipAresentf are intavt,	N=O	
Rhe vooler or samAles co not aAAear to haye been vomAromisec or tamAerec ' ith,	Rue	
SamAles ' ere reveiyec on ive,	Rue	
Cooler RemAerature is avveAtable,	Rue	
Cooler RemAerature is revorcec,	Rue	
CI C is Aresent,	Rue	
CI C is pillec out in in< anc le. ible,	Rue	
CI C is pillec out ' ith all Aertinent inppormation,	Rue	
Is the ?ielc SamAlerls name Aresent on CI CH	Rue	
There are no cislveAanvies bet' een the vontainers reveiyec anc the CI C,	Rue	
SamAles are reveiyec ' ithin (olcin. Rime æ)vlucin. tests ' ith imieceate (RsP	Rue	
SamAle vontainers haye le. ible labels,	Rue	
Containers are not bro<en or lea<in. ,	Rue	
SamAle vollevtion cate=times are Aroyicec,	Rue	
OAAroAriate samAle vontainers are usec,	Rue	
SamAle bottles are vomAetelwpilec,	Rue	
SamAle Vreseryation qeripec,	N=O	
There is suppvient yol, pr all reMuestec analvsesf invl, anwreMuestec z Sz SDs	Rue	
Containers reMuirin. 6ero heacsAave haye no heacsAave or bubble is / 4mm x7-9"P,	Rue	
z ultiAhasiv samAles are not Aresent,	Rue	
SamAles co not reMuire sAlittin. or vomAositin. ,	Rue	
desicual Chlorine Chev<ec,	N=O	

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:

- 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:

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:

- 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.

- 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 did not note any discrepancies associated with samples in this WO. Discrepancies included in the case narrative are associated with WO 320-23310.

- 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 affect 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 level 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:

N/A; PFCs were not detected above the PQL in the 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 and MS/MSD samples 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 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:

The percent recoveries were within method required 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 were within method required acceptance criteria.

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

Comments:

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

- 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 percent recoveries are within the laboratory 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 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; see above.

iv. If above PQL, what samples are affected?

Comments:

A trip blank was not required; see above.

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 with 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 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:

A field duplicate pair was not submitted with this work order.

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.

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, therefore 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 work order.

ii. If above PQL, what samples are affected?

Comments:

N/A; an equipment blank was not submitted with this work order.

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.

APPENDIX F
BOTTLED WATER RECIPIENTS

BOTTLED WATER RECIPIENTS

SHANNON & WILSON

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

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

APPENDIX G

**IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL/ENVIRONMENTAL REPORT**

Date: December 2016

To: City of Fairbanks Engineering Division
Attn: Jackson Fox

Re: June to October 2016 Private Well Sampling
Summary Report, Fairbanks, Alaska

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