

FINAL – 2018 PFAS GROUNDWATER CHARACTERIZATION

FAI – SITEWIDE PFAS FAIRBANKS, ALASKA



ADEC FILE NO.: 100.38.277

ADEC HAZARD IDENTIFICATION NO.: 26816

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FINAL
8 APRIL 2019

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADS	Arctic Data Services, LLC
AFFF	aqueous film forming foam
ARFF	aircraft rescue and firefighting
bgs	below ground surface
bgw	below groundwater
bws	below water surface
COC	contaminant of concern
COPC	contaminant of potential concern
DOT&PF	Department of Transportation and Public Facilities (Alaska)
DQA	data quality assessment
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FAI	Fairbanks International Airport
FTA	fire training area
HDPE	high density polyethylene
IDW	investigation derived waste
LHA	lifetime health advisory level
LOD	limit of detection
LOQ	limit of quantitation
MB	method blank
NAVD	North American Vertical Datum
ng/kg	nanograms per kilogram
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
PCB	polychlorinated biphenyls
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutane sulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxS	perfluorohexane sulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
QC	quality control
QEP	qualified environmental professional
R&M	R&M Consultants, Inc.
RPD	relative percent difference

SDG	sample delivery group
TIN	triangle irregular network
TMW	temporary monitoring well
USGS	U.S. Geological Survey
WGS	World Geodetic System

EXECUTIVE SUMMARY

The Alaska Department of Transportation and Public Facilities (DOT&PF) Fairbanks International Airport (FAI) retained R&M Consultants, Inc. (R&M) to conduct a groundwater characterization to investigate per- and polyfluoroalkyl substances (PFAS) contamination detected in groundwater during 2017 at FAI. The field investigation occurred in two mobilizations from 10 August to 18 August and 4 October to 6 October 2018.

The objectives of the field investigation were as follows:

- Prepare an Alaska Department of Environmental Conservation (ADEC) approved PFAS Groundwater Characterization Plan
- Characterize and begin delineation of PFAS groundwater contamination associated with past aqueous film forming foam (AFFF) use at FAI based on the following:
 - Horizontal Groundwater Delineation
 - Vertical Groundwater Migration Profile
 - Source Soil Profile
 - Groundwater Flow Direction
 - Chena River PFAS Migration
- Investigate potential PFAS contamination intermingling with the City of Fairbanks Regional Fire Training Center Burn Pit PFAS plume (ADEC File Number 102.38.182)

INVESTIGATION OBSERVATIONS AND RESULTS

The PFAS analytes perfluorobutane sulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluorooctane sulfonate (PFOS), and perfluorooctanoic acid (PFOA) are considered contaminants of concern (COC) for the project. Chemical testing results from soil samples were compared to the most stringent 18 Alaska Administrative Code (AAC) 75 cleanup levels for PFOS and PFOA. Remaining analytes do not have assigned soil cleanup levels. PFOS and PFOA were detected above soil cleanup levels (3,000 and 1,700 nanograms per kilogram [ng/kg], respectively) at the FAI fire training area (FTA) and aircraft rescue and firefighting (ARFF) source areas at up to 3,000,000 and 42,000 ng/kg, respectively.

Water sample (surface and groundwater) results were compared to ADEC action levels from the ADEC Technical Memorandum “Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water.” PFBS exceeded the 2,000 nanogram per liter (ng/L) action level in groundwater from the upper sample from the FTA source area (TW101) at 9,000 ng/L. The five PFAS summation results were calculated by summing the individual results for PFHpA, PFHxS, PFNA, PFOS, and PFOA. Five PFAS summation results exceeded the 70 ng/L action level in samples from 25 of 44 temporary monitoring wells or existing monitoring wells and four of 17 surface water locations at concentrations between 75 and 740,000 ng/L.

INVESTIGATION CONCLUSIONS

Soil samples collected from near the FTA and ARFF source areas indicate that a significant quantity of PFAS contamination remains available for migration to groundwater at the FTA source area and a lesser amount at the ARFF source area. Two major areas of contaminated groundwater exceeding the ADEC action level for the five PFAS summation analytes were identified starting at the FTA, ARFF,

and the ramp immediately southeast of the FAI Terminal. These contaminated zones appear to extend from the source areas to the southwest bank of the Chena River. Two minor areas of contamination are expected to be of limited extent and were identified with origins along the northwest side of the northeast half of Runway 2L-20R. The northeast area of contamination present in the Dale Road Neighborhood is associated with an unknown source based on results from this investigation and groundwater flow direction in the area.

Groundwater in the area is primarily controlled by the Tanana River and flows to the northwest across FAI. The Chena River, permafrost, and bedrock located northwest of FAI appear to cause groundwater to turn from the northwest to the southwest along the northwest boundary of FAI, generally along the course of the Chena River.

PFAS contamination, especially at the current FTA, appears to extend to a significant vertical depth. The deepest sample at the FTA Source Area from 116 feet below groundwater (bgw) exceeded the 70 ng/L action level at 330 ng/L. The vertical characterization sampling location across the Chena River from the area of contamination associated with the FTA Contaminated Zone shows an initial decrease in PFAS concentration followed by an increase at 40 feet bgw before continuing to decrease. The Chena River appears to shield the upper aquifer from contaminant migration on the downgradient side. The Central Contaminated Zone exceeding the action level in the Dale Road Neighborhood exhibit vertical chemical stratification due to groundwater interactions between the Chena and Tanana Rivers.

Contaminated zone boundaries are coarsely bound by chemical results and rely heavily on presumed groundwater flow direction. Contamination associated with the City of Fairbanks Regional Fire Training Center PFAS Source Area appears to be migrating across the northeast FAI property boundary based on soil and groundwater results.

RECOMMENDATIONS

R&M provides the following recommendations regarding COC for FAI:

- The six PFAS analytes (PFBS, PFHpA, PFHxS, PFNA, PFOS, and PFOA) should be maintained as COC for the Site.

R&M provides the following recommendations regarding investigation derived waste disposal:

- Containerized waste water IDW should be disposed by an ADEC approved waste contractor and should be assumed to contain petroleum hydrocarbon as well as PFAS contaminants due to the presence of multiple existing ADEC listed contaminated sites within the investigation area. There are four waste water 55-gallon drums from this investigation.

R&M provides the following recommendations regarding further investigation of PFAS contamination related to AFFF use at FAI:

- Investigate the data gaps identified by this report (horizontal and vertical delineation, groundwater flow (contaminant migration), and contaminant source).
- Design and install a long-term groundwater monitoring well and surface water sampling network to monitor contamination associated with the various PFAS source areas over time and in coordination with ADEC.

- Consider targeted source area remediation of soil and/or groundwater to reduce the quantity of PFAS contaminants in the environment.
- The City of Fairbanks should be informed of data indicating the apparent migration of contamination associated with the City Source Area onto FAI property.

1.0 INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT&PF) Fairbanks International Airport (FAI) retained R&M Consultants, Inc. (R&M) under Professional Services Agreement 025-6-1-041, Notice to Proceed Number P2-1 to investigate the per- and polyfluoroalkyl substances (PFAS) detected in groundwater during 2017. FAI is listed as FIA – Sitewide PFAS (Site) with Alaska Department of Environmental Conservation (ADEC) File Number 100.38.277 and a Hazard Identification of 26816. The Site includes the entire FAI property and the associated PFAS groundwater contamination area extending offsite to the north and west. Significant groundwater testing of private water supply wells to the north and west of FAI has been conducted by Shannon & Wilson, Inc. for FAI in 2017 and 2018. Additional information about the Site is provided in **Section 2.0** (Site Description) **Drawings A-01 and A-02** provide location and vicinity and site feature maps of the project area (**Appendix A**). **Drawing A-03** provides an overview of the investigation area and locations.

Activities were performed in accordance with the approved PFAS Groundwater Characterization Plan (Work Plan) (R&M, 2018), 18 Alaska Administrative Code (AAC) 75 (ADEC, 2018a), and ADEC Field Sampling Guidance (ADEC, 2017d). This investigation was designed to begin delineation of PFAS groundwater contamination originating on FAI from past aqueous film forming foam (AFFF) use.

1.1 INVESTIGATION OBJECTIVES

The objectives of the field investigation were as follows:

- Prepare an ADEC approved PFAS Groundwater Characterization Plan
- Characterize and begin delineation of PFAS groundwater contamination associated with past AFFF use at FAI based on the following:
 - Horizontal Groundwater Delineation
 - Vertical Groundwater Migration Profile
 - Source Soil Profile
 - Groundwater Flow Direction
 - Chena River PFAS Migration
- Investigate potential PFAS contamination intermingling with the City of Fairbanks Regional Fire Training Center Burn Pit PFAS plume (ADEC File Number 102.38.182)

1.2 CONTAMINANTS OF POTENTIAL CONCERN

Based on past site use and the scope of this characterization, PFAS are considered contaminants of potential concern (COPC). PFAS that will be investigated include the following compounds:

- Perfluorobutane sulfonic acid (PFBS)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluorononanoic acid (PFNA)
- Perfluorooctane sulfonate (PFOS)
- Perfluorooctanoic acid (PFOA)

1.3 WORK PLAN CHANGES AND DECISION POINT APPROVALS

Two changes were made to the approved Work Plan and one decision point was approved to select additional sampling locations as described in the following sections.

1.3.1 WORK PLAN CHANGE #1

The phased investigation approach was altered due to significant delays at the selected analytical laboratory, Test America – Sacramento. These delays precluded having chemical samples analyzed on rush turnarounds times. Changes due to laboratory delays were made to maintain the ability to select additional sampling locations based on Phase I results. ADEC approved changes on 25 July 2018 (**Appendix J**). This impacted the proposed approach as follows:

- Advanced Phase I investigation locations as planned
- Demobilized and waited for data from Test America
- Combined Phase II and III into a single phase and selected locations based on Phase I results
- Remobilized the drill rig and sampled combined Phase II/III locations

1.3.2 WORK PLAN CHANGE #2

Field staking of proposed investigation locations led to alteration of 26 and deletion of four locations. Locations were primarily moved to avoid potential or perceived private property conflicts, obvious utility conflicts, or to prevent impacts to residents during drilling. The four locations deleted were solely from Phase II or Phase III and resulted from access issues. A detailed list of the altered and deleted locations along with reasoning for the change and the presumed effect the change may have on the investigation are provided in **Appendix J**. ADEC approved changes on 2 August 2018

1.3.3 DECISION POINT APPROVAL #1

Following receipt and preliminary analysis of Phase I chemical data, 11 locations were selected for the combined Phase II/III investigation. Originally, 15 locations were planned for a combined Phase II/III. Due to data gaps surrounding vertical migration and extent, a reduction in the number of locations was proposed to gain additional data to understand the vertical nature of contamination.

The locations and reasoning for selection are provided below:

- TW123a: Carry over from Phase I (Sample at approximately 1 to 2 feet below groundwater [bgw])
- TW216: Increase understanding of how PFAS contamination from the fire training area (FTA) is migrating (Sample at 5 feet bgw).
- TW210a and TW202: Refine the PFAS contamination boundary exceeding the action level in the Dale Road Neighborhood and sample at approximately 1-2 feet bgw.
- TW208a and TW211: Understand vertical contaminant migration in the Dale Road Neighborhood (Sample at 25 feet bgw).
- TW310, TW218a and TW219: Understand vertical contaminant migration and refine the boundary of contaminants above action levels in the vicinity of the Dale Road Neighborhood by sampling at approximately 5 and 25 feet bgw.

- TW207a and TW302a: Understand contaminant migration (horizontal and vertical) in the vicinity of Trail Breaker Kennels (Sample at 5 and 25 feet below groundwater).
- SW201: Refine boundary of contaminants above action levels southeast of the FTA (Sample surface water at approximately 1 foot below the surface)

ADEC approved the proposed Phase II/III investigation locations and approach on 19 September 2018.

1.3.4 PROPOSED CLEANUP AND ACTION LEVEL CHANGES

The Work Plan referenced groundwater cleanup levels published in 18 AAC 75 (ADEC, 2018a). The Environmental Protection Agency (EPA) has set a lifetime health advisory level (LHA) of 70 nanograms per liter (ng/L) for the sum of PFOA and PFOS concentrations. For the Work Plan, ADEC recommended that 65 ng/L be used based on the calculation method for the LHA which rounds the calculated value to a single significant digit.

In August 2018, ADEC released a Technical Memorandum instituting new action levels for PFAS analytes in groundwater and drinking water (ADEC, 2018b). This guidance established a combined action level of 70 ng/L for the summation of analytes PFHpA, PFHxS, PFNA, PFOS, and PFOA (five PFAS summation) and 2,000 ng/L for the analyte PFBS. Non-detect values will be managed in accordance with ADEC guidance for the combined action level (ADEC, 2018b and ADEC, 2012). Action levels promulgated by the August 2018 technical memorandum are used by this report.

2.0 SITE DESCRIPTION

The Site is an international cargo and passenger facility located approximately five miles southwest of the urban center of Fairbanks, Alaska. FAI is situated northeast of the confluence of the Chena and Tanana rivers (**Drawing A-01**). FAI is situated within the Chena and Tanana River floodplains and is bordered to the south by the Tanana River and to the west and north by the Chena River.

FAI is located in Township 1 South, Range 1 West, and Sections 18, 19, and 30 and Township 1 South, Range 2 West, and Sections 13, 23, 24, 25, and 26 of the Fairbanks Meridian. The Site is located in the Fairbanks D-2 U.S. Geological Survey (USGS) 15-minute quadrangle. Primary access to FAI is provided by Airport Way running along the northwest side of the airport. The investigation area is shown in overview on **Drawings A-02 and A-03**, and investigation locations are shown on **Drawings A-03, Drawing A-05** provides location information for each investigation location. Historical aerial photographs of the FAI area are provided as **Drawings A-07 and A-08**.

TABLE 2-1: SUMMARIZED SITE DETAILS

Site Data Category	Description
Site Name	FIA – Sitewide PFAS
Latitude / Longitude	64.813025 North / 147.873165 West in the WGS 1984 datum
Street Address	6450 Airport Way; Fairbanks International Airport, Fairbanks, AK 99709
Current Land Use	International cargo and passenger airport
Past Land Use	International cargo and passenger airport

NOTES:

For definitions, see the Acronyms and Abbreviations table.

2.1 TOPOGRAPHY

The FAI property is a relatively flat area located on abandoned channels and deposits of the Chena and Tanana River floodplains.

2.2 SURFACE DRAINAGE

Numerous ponds formed by construction activities are present at FAI and are presumed to represent the groundwater table elevation in the unconfined aquifer present in the alluvial floodplain deposits. Notable ponds from construction or grading related activity include Drainage Ponds located northwest of the passenger terminal, the Float Pond located southeast of Runway 2L – 20R, and a former material site that later flooded located southeast of the developed airfield.

Several backchannel water ways of the Tanana River are located on the south and southeast sides of FAI property, including an oxbow lake that wraps around the east, south, and west sides of the FTA. The Chena River is located to the north and west and the Tanana River is located to the south of FAI. **Drawing A-02** shows the locations of major surface water bodies.

2.3 GENERAL GEOLOGY

FAI is within the Tanana-Kuskokwim Lowland physiographic province (Wahrhaftig, 1965). The idealized soil column in undisturbed areas around FAI consist of fine sand and silt over-bank deposits overlying generally cleaner and coarser channel deposits of sand and gravel with cobbles (Péwé and Bell, 1976). The thickness of the finer-grained surface deposits typically increases with distance from the active Chena and Tanana River channels. In the Fairbanks area, these alluvial deposits are reported to extend to depths of approximately 400 to 600 feet.

The shallow soil column across most of the airport has been altered during past construction projects and developments. Reworked and variable surface materials are now present in many of these areas and range from elevated engineered fills to fine-grained organic rich soils used to backfill drainage channels, wetlands, and old borrow pits. **Drawings A-07 and A-08** provide historical aerial photographs of the area.

Permafrost occurs sporadically within the Tanana floodplain and has been encountered at FAI during past geotechnical investigations. The area has been mapped as being generally underlain by numerous isolated masses of permafrost (Ferrains, 1965). Permafrost, when present, is typically found under wetter areas covered with relatively dense vegetation. It generally occurs as segregated ice in the soil pore spaces or as coatings around soil particles, rather than large ice masses (Péwé, 1982). Otherwise permafrost has not been reported at FAI under the active river channels and surfaces disturbed or reworked for the existing airport facilities and pavements.

2.4 GROUNDWATER CONDITIONS

Groundwater has been observed between approximately the surface and 12 feet below ground surface (bgs) by past environmental and geotechnical investigations (R&M, 2017; R&M, 2007; R&M, 2006; R&M, 2005; R&M, 2004; R&M, 2003; R&M, 2001; R&M, 2000; and S&W, 1991). Additionally, a 1996 USGS report on groundwater in the alluvial plain between the Tanana and Chena Rivers was reviewed (USGS, 1996). This investigation also collected groundwater elevation data to determine flow conditions in August 2018. Based on the presence of the Chena and Tanana Rivers, the assumed moderate to high permeability of alluvial soils, and the relatively flat topography of FAI, groundwater flow is expected to be relatively complex. Groundwater elevation contours and interpreted flow conditions are presented for different flood stages of the Chena and Tanana Rivers in 1986, 1987, 1988, and 2018 on **Drawing A-06**.

2.4.1 PREVIOUS GROUNDWATER FLOW INVESTIGATIONS (USGS, 1996)

The 1996 USGS report indicates that groundwater flows from east/southeast to west/northwest across FAI property. Due to permafrost and bedrock located west to northwest of the Chena River, groundwater flow appears to turn approximately 90 degrees to the south-southwest / southwest generally along the course of the Chena River (Péwé and Bell, 1976). The 1996 USGS report best shows this turn in groundwater flow direction in the 1986 data set, but it is also present in the 1987 and 1988 data sets. This flow pattern indicates that significant vertical flow gradients, based on general modeling of regional groundwater flow (Fetter, 2001) are interpreted to exist along the western boundary of FAI along the Chena River.

2.4.2 2018 GROUNDWATER FLOW INVESTIGATION

Temporary monitoring wells selected in the Work Plan were surveyed with differential level loops to provide accurate elevation data. This data was used to perform three-point solutions to calculate groundwater contours for each triangle defined by each group of three elevation points. This triangle irregular network (TIN) is presented as **Drawing A-04**. The groundwater contours generated from the 2018 survey data are consistent with conditions documented by the 1986 and 1987 datasets somewhere between the high-stages of the Chena and Tanana Rivers. Review of river level gage data (**Appendix F**) indicate that the Tanana River was at high-stage and the Chena River at mid-stage at the time groundwater depths were measured in August 2018.

An apparently large variance in groundwater elevation of 4 to 8 feet is expected to result from 1980s groundwater elevations being reported in the National Geodetic Vertical Datum (NGVD) 1929 vertical datum, while 2018 data are presented in the more recent North American Vertical Datum (NAVD) 1988 vertical datum. In the FAI area the difference between the two datums is approximately 3 to 5 feet from the 1929 to 1988 datum based on National Geodetic Survey vertical control datasheets (**Appendix F**). Taking into account the datum elevation shift, 2018 results are consistent with the earlier datasets, especially July 1987 when the Tanana was at high-stage.

2.5 CLIMATE

Based on climate data (1949 to 2012) recorded at the Fairbanks International Airport, Alaska (502968) weather station, the mean annual air temperature was 27 degrees Fahrenheit (°F), with minimum and maximum monthly averages of approximately -10 °F (January) and 62 °F (July), respectively. The area received an average of 10.5 inches of precipitation per year, with a maximum monthly mean of approximately 1.9 inches in July (WRCC, 2018).

2.6 PREVIOUS INVESTIGATIONS

Three limited investigations into PFAS contamination of groundwater associated with fire response and training activities at FAI have occurred. A fourth investigation is ongoing to investigate PFAS contamination associated with the City of Fairbanks FTA (**Section 2.6.4**). One investigation (**Section 2.6.1**) is ongoing to characterize the nature and extent of PFAS contamination in drinking water wells located downgradient of FAI (between FAI and the Chena River). The other two investigations collected limited PFOA and PFOS data for groundwater and surface water within the FAI property boundary (**Sections 2.6.2 and 2.6.3**). The investigations and associated results are summarized below.

2.6.1 WATER WELL PFAS SAMPLING (2017 TO 2018)

An ongoing investigation by Shannon & Wilson, Inc. to determine PFAS impacts to private water wells located between FAI and the Chena River and the north bank of the Chena started in 2017 and continues into 2018. As of 30 November 2018, of 193 wells sampled, 188 have results published with 102 exceeding and 86 below the 70 ng/L action level (five PFAS summation) with 5 results outstanding. Limited data is available on well screen and pump depths for the private water wells that have been sampled by this investigation.

2.6.2 DON BENNETT SHOOTING RANGE PFOA/PFOS SAMPLING (2017)

Based on the investigation report (Brice, 2017), four temporary monitoring wells (TMW) were installed to collect a single groundwater sample for PFOA and PFOS analysis in August 2017. Three were located from within the shooting range berm and one was located approximately 300 feet northwest of the firing line. One TMW from within the bermed area exceeded the 400 ng/L PFOS cleanup level at 646 ng/L and all TMW from within the bermed area exceeded the 65 ng/L LHA (78.0 to 670 ng/L). The single TMW from outside the bermed area had a combined PFOS/PFOA result of 57.1 ng/L.

2.6.3 FAI AFFF WATER MONITORING REPORT (2017)

Based on the sampling report (SLR, 2017), PFOA and PFOS groundwater and surface water samples were collected from six existing monitoring wells and four surface water bodies within the FAI property boundary. Samples from wells in the former drainage pond area northwest of the Alaska Airlines Cargo office and the Former MarkAir Warehouse exceeded ADEC cleanup levels for PFOA and PFOS. Wells from near the Tesoro Petroleum Terminal, outside the passenger terminal, northwest of the Alaska Airlines Cargo office, and from the Former MarkAir Warehouse exceeded the LHA. The monitoring wells from near the Federal Aviation Administration (FAA) East Ramp Control Tower and the Tesoro Tank Farm were below the cleanup and the LHA. Results exceeding groundwater cleanup levels and the LHA are summarized below:

- PFOA exceeded the 400 ng/L cleanup level at 610 and 850 ng/L in monitoring wells MW-11 and MW-15.
- PFOS exceeded the 400 ng/L cleanup level at 5,500 and 18,000 ng/L in monitoring wells MW-11 and MW-15.
- The LHA of 65 ng/L was exceeded in monitoring wells MW-11, MW-15, MW-23, and Sentry with concentrations ranging from 90 to 18,850 ng/L.

Surface water samples from the Float Pond, the North Terminal Pond, and the Jet Ski Pond were non-detect or below cleanup levels and the LHA for PFOA and PFOS. Surface water samples from the Land Farm Pond and South Terminal Pond exceeded the 65 ng/L LHA at 1,560 and 321 ng/L, respectively. The Land Farm Pond also exceeded the 400 ng/L groundwater cleanup level for PFOS at 1,300 ng/L.

2.6.4 CITY OF FAIRBANKS FIRE TRAINING AREA (2014 - 2018)

A search of the ADEC contaminated sites database provided the following information. In 2014 a site investigation was conducted associated with the closure of the burn pit (a.k.a. combustible liquids pit) at the Fairbanks Regional Fire Training Center. The pit was constructed in 1987 and used for firefighting exercises for about 20 years. These exercises consisted of filling the pit with water, adding fuel (jet, diesel, and/or gasoline) to float on water and then igniting and extinguishing fires. The pit is reported to have not been used for about 10 years. The pit can be identified from satellite imagery as a circular feature and is reported about 40 feet in diameter with a concrete rim, 2 feet of gravel, and a liner. To prepare the pit for decommissioning, samples were collected from standing water and sediment in the pit. Petroleum and PFAS compounds were detected in water. ADEC recommended further characterization data before determining disposition of the contents of the pit as polychlorinated biphenyls (PCB) were reported as non-detect at elevated reporting limits and the solid material was not analyzed for PFAS. PFAS were detected in the water samples collected

from the pit. ADEC recommended further site characterization to include sampling of soil and groundwater for petroleum and PFAS.

2.7 ALTERNATE WATER SOURCES

FAI enacted a project in the summer of 2018 to connect residences with wells impacted by PFAS contamination exceeding the action level to the College Utilities public water system. As of 30 November 2018, 61 residences have been connected to the public water system. An additional 23 residential claims are under review to determine status by the DOT&PF Department of Risk Management. FAI continues to provide deliveries of drinking water to affected residences on an as needed basis.

2.8 POTENTIAL CONTAMINATION SOURCES

The following information was provided by FAI emergency response staff in February 2018. Historic AFFF releases are due to emergency response and training. FAI indicated that protein based foams were used at the airport prior to PFAS based foams. Protein based foams were most likely used at the airport in the 1970s and PFAS based took over in the early 1980s. PFAS based foams have been used at FAI since they became the normal foams required by FAA for Aircraft Rescue and Firefighting (ARFF) use. Foams believed to contain either PFOS/PFOA or those that degrade to PFOA have been used at the airport until approximately spring of 2017. Old PFAS (8 carbon chain [C8]) based foams were removed from airport property including in ARFF vehicles in January 2018 and replaced with six carbon chain (C6) PFAS based foams in February 2018. The corresponding alpha identifiers presented below are also displayed on **Drawing A-03**.

- A. **AFFF Use Location Name:** Current Fire Training Area/Pit
Approximate Date of AFFF Use (time frame, year, etc.): 1993 to present.
Approximate Volume and Frequency of AFFF Used: 50 to 100 gallons per year.
Description of AFFF Use: ARFF training with live fires, contained within a lined pit.

- B. **AFFF Use Location Name:** Former Land Farm
Approximate Date of AFFF Use (time frame, year, etc.): Not applicable.
Approximate Volume and Frequency of AFFF Used: Not applicable.
Description of AFFF Use: The land farm was constructed in 1991. Materials excavated from the former fire training area (refer to C) during the remediation of the former fire training area were placed in the lined land farm area for treatment. These excavated materials are known to have been contaminated with petroleum products. It is assumed that these soils would have been contaminated with AFFF compounds in addition to petroleum products based on the fire training (with AFFF) activities that occurred at the former fire training area.

- C. **AFFF Use Location Name:** Former Fire Training Area/Pit
Approximate Date of AFFF Use (time frame, year, etc.): Late 1970s to early 1980s, until 1993.
Approximate Volume and Frequency of AFFF Used: 200 or more gallons a year, monthly discharges.
Description of AFFF Use: ARFF training with live fires, contained within an unlined pit.

- D. **AFFF Use Location Name:** Former Interim Fire Training Area/Pit

Approximate Date of AFFF Use (time frame, year, etc.): Unknown – most likely between mid-1990 when cleanup up of the Former Fire Training Area was occurring to 1993 when construction of the current Fire Training Area/Pit was completed.

Approximate Volume and Frequency of AFFF Used: Unknown – most likely 200 or more gallons a year, monthly discharges, based on similar uses of the Former Fire Training Area/Pit.

Description of AFFF Use: Monthly ARFF live fire training.

- E. **AFFF Use Location Name:** Apparatus Water Drafting Training Site (Land Farm Pond)
Approximate Date of AFFF Use: 1998 through 2009.
Approximate Volume and Frequency of AFFF Used: No AFFF use known, doing drafting training (priming the fire pump with water) for 4 trainees a year on 4 apparatus.
Description of AFFF Use: AFFF in the lines would be drawn down into the pump due to suction placed on the system trying to pick up a draft (water flow) from a static water source.
- F. **AFFF Use Location Name:** South Deicing Basin Discharge Culvert
Approximate Date of AFFF Use (time frame, year, etc.): 1998 through 2017 (truck cleanout rinse waters), 1998-2009 (target practice).
Approximate Volume and Frequency of AFFF Used: Approximate 30 gallons a year.
Description of AFFF Use: When ARFF truck AFFF tanks needed to be cleaned out, rinse waters from the trucks would be sprayed into the deicing basins. Basins are (generally) drained and discharged to the utilities after spring thaw, but any collected storm water after the spring thaw discharge is let to the environment. The discharge goes through a culvert releasing to the field to the south. During the deicing season, snow laden with glycol is stored directly west of the basin. These snow dumps were used as a three dimensional object for foam target practice and operational checks.
- G. **AFFF Use Location Name:** ARFF Station Ramp Side
Approximate Date of AFFF Use (time frame, year, etc.): Early 1970s until 2007.
Approximate Volume and Frequency of AFFF Used: More than 1,000 gallons total, regular discharges of 5 or more gallons monthly if not weekly.
Description of AFFF Use: Every aspect of operational use, including emergency application had occurred at the station. There were multiple types of foam used as well, 6 percent AFFF, Medium and High Expansion foam, and standard class B, 3 percent going back to the origin of foam use in aviation.
- H. **AFFF Use Location Name:** Original Fire Training Pit and ARFF Station Back Parking lot
Approximate Date of AFFF Use (time frame, year, etc.): Establishment of station early 1970s, late 1960s – 2007.
Approximate Volume and Frequency of AFFF Used: 1,000 or more gallons total over the years, exact amount unknown
Description of AFFF Use: There was also a 1970s fire training pit. At this location where fuel and foam were fought directly on the ground for training. This is also where the west parking lot hydrant was utilized to perform the foam inductor skills for Firefighter II.
- I. **AFFF Use Location Name:** Ditch Adjacent to Alaska Airlines Building
Approximate Date of AFFF Use (time frame, year, etc.): 1970s to 2015
Approximate Volume and Frequency of AFFF Used: 100 gallons total via sporadic use, mainly emergency responses.

Description of AFFF Use: Omni van fire, major Cargolux fuel spill, occasional apparatus testing or cert inspection. Drains from west ramp end up here.

- J. **AFFF Use Location Name:** Wein Lake Pond Drain
Approximate Date of AFFF Use (time frame, year, etc.): When the drain system was built, until 2015. Last fire in parking lot was spring 2017 and only water was used.
Approximate Volume and Frequency of AFFF Used: Estimated 1,000 or more gallons (actual quantity is unknown), drains directly from station and ramp. Multiple vehicle fires in parking lot and on concourse.
Description of AFFF Use: Truck checks, training, FAA inspections, truck maintenance.
- K. **AFFF Use Location Name:** Everts Hanger Fire
Approximate Date of AFFF Use (time frame, year, etc.): 2013.
Approximate Volume and Frequency of AFFF Used: 40 gallons (uncertain quantity), 1 time use.
Description of AFFF Use: Aircraft fuel fire in hanger, 40 gallons flowed on aircraft.
- L. **AFFF Use Location Name:** Brooks DC-4 Fire
Approximate Date of AFFF Use (time frame, year, etc.): 2003.
Approximate Volume and Frequency of AFFF Used: 200 or more gallons, one time.
Description of AFFF Use: Aircraft engine fire, flowed from 3 apparatus, fire took 30 minutes to put out due to being a metal fire.
- M. **AFFF Use Location Name:** North Wein Pond – See location “N” below.
- N. **AFFF Use Location Name:** North Deicing Basin
Approximate Date of AFFF Use (time frame, year, etc.): 1998 through 2017 (truck cleanout rinse waters), 1998-2009 (target practice).
Approximate Volume and Frequency of AFFF Used: Approximate 30 gallons a year.
Description of AFFF Use: When ARFF truck AFFF tanks needed cleaned out, rinse waters from the trucks would be sprayed into the deicing basins. Basins are (generally) drained and discharged to the utilities after spring thaw, but any collected storm water after the spring thaw discharge is let to the environment. The discharge goes through a culvert releasing to the North Wein Pond location “M” on **Drawing A-03**. During deicing season, snow laden with glycol is stored directly west of the basin. These snow dumps were used as 3-d object for foam target practice and operational checks.
- O. **AFFF Use Location Name:** Apparatus Water Drafting Training Site
Approximate Date of AFFF Use: 1998 through 2009.
Approximate Volume and Frequency of AFFF Used: Less than 5 gallons annually, doing drafting for 4 trainees a year on 4 apparatus.
Description of AFFF Use: AFFF in the lines would be drawn down into the pump due to suction placed on the system trying to pick up a draft (water flow) from a static water source. Believed to be incidental.
- P. **AFFF Use Location Name:** Runway 20L, multiple aircraft incidents over the years
Approximate Date of AFFF Use (time frame, year, etc.): 2003 to present.
Approximate Volume and Frequency of AFFF Used: 5 incidents with an average of 15 gallons of foam each. Estimated as 75 gallons in total.

Description of AFFF Use: Standard ARFF procedure with fuel spills on aircraft accidents during summer months.

- Q. AFFF Use Location Name:** Center point of runway 2L – 20R
Approximate Date of AFFF Use (time frame, year, etc.): Runway creation until 2015.
Approximate Volume and Frequency of AFFF Used: Annually, flowing approximately 3 to 10 gallons per response.
Description of AFFF Use: FAA inspectors would request response to the center point of the runway and show agent annually, practice stopped in 2015 time frame, sometimes it would occur on multiple shifts per inspection.
- R. AFFF Use Location Name:** Center Field Ponds
Approximate Date of AFFF Use (time frame, year, etc.): 2004.
Approximate Volume and Frequency of AFFF Used: 210 gallons one time.
Description of AFFF Use: An ARFF truck was stuck in the mud and the 210 gallon tank was drained during the extraction.

3.0 INVESTIGATION METHODS AND RESULTS

Samples were collected according to procedures specified by the Work Plan (R&M, 2018) and ADEC Field Sampling Guidance (ADEC, 2017d). Test boring logs from soil test borings are provided in **Appendix B**. Field notes and existing well sample forms are provided in **Appendices C and D**. A photograph log is provided as **Appendix E**. River gauge data and National Geodetic Survey data sheets are provided in **Appendix F**. Christopher Fell of R&M was the ADEC qualified environmental professional (QEP) on site as required by 18 AAC 75 (ADEC, 2018a). The field investigation occurred in two mobilizations from 10 August to 18 August and 4 October to 6 October 2018.

Samples were submitted to Test America in Sacramento, California for chemical testing. Test America – Sacramento is an ADEC approved laboratory and is Environmental Laboratory Accreditation Program (ELAP) certified for the analytical methods used. Summary tables of the complete chemical results are included in **Appendix G**. The Data Quality Assessment (DQA) is provided in **Appendix H** and summarized in **Section 4.o**. Level 2 data reports are included as **Appendix I**. The following sections provide additional details about the investigation and present chemical results.

One or more PFAS analytes were detected in soil samples from three of four soil test borings, all 17 surface water locations, and in groundwater from 43 of 44 temporary monitoring and existing monitoring wells. Samples analyzed and associated results are summarized in **Section 3.2** for the soil and in **Section 3.3** for surface water and groundwater. Primary and associated duplicate samples are treated as a single analysis for the following discussion with the highest detection being utilized. Quality control (QC) is discussed in **Section 4.o** and in **Appendix H**.

3.1 PROPOSED CLEANUP AND ACTION LEVELS

This investigation included sampling of soil, surface water, and groundwater. ADEC does not have surface water cleanup levels for any of the PFAS analytes. Soil and groundwater only have established cleanup levels for the analytes PFOA and PFOS (ADEC, 2018a). ADEC released a technical memorandum setting drinking, surface, and groundwater action levels for the six PFAS analytes analyzed for by this investigation as well as setting a combined action level for the summation of analytes PFHpA, PFHxS, PFNA, PFOS, and PFOA (five PFAS summation). PFBS was assigned a separate action level (ADEC, 2018b). In tables and drawings included with this report, chemical results are highlighted where they exceed the cleanup or action level (red and bold) and where they are between the cleanup/action level and 50 percent of the level (blue and bold). For soil results with no associated cleanup/action level, results are compared to 10 times the groundwater cleanup level (highlighted orange and bold).

Data collected by this investigation will be compared to the published cleanup levels for PFOA and PFOS in soil and to the action levels for surface and groundwater. The cleanup and action levels used to assess data are detailed below:

3.1.1 SOIL CLEANUP LEVELS

- PFBS: None assigned, results in **Appendix G** are referenced to 10 times the water action level for comparison.

- PFHpA: None assigned, results in **Appendix G** are referenced to 10 times the water action level for comparison.
- PFHxS: None assigned, results in **Appendix G** are referenced to 10 times the water action level for comparison.
- PFNA: None assigned, results in **Appendix G** are referenced to 10 times the water action level for comparison.
- PFOS: 3,000 nanograms per kilogram (ng/kg)
- PFOA: 1,700 ng/kg

3.1.2 SURFACE WATER AND GROUNDWATER ACTION LEVELS

- PFBS: 2,000 ng/L
- PFHpA: see five PFAS summation
- PFHxS: see five PFAS summation
- PFNA: see five PFAS summation
- PFOS: see five PFAS summation
- PFOA: see five PFAS summation
- Five PFAS summation: 70 ng/L

3.2 SOIL SAMPLING AND RESULTS

Soil samples were collected based on the Work Plan (R&M, 2018) and soil horizons most likely to be contaminated based on ADEC Field Sampling Guidance (ADEC, 2017d). Chemical samples were collected from approximately one to two feet below the existing ground surface and from the groundwater interface where observed during the investigation. Soil samples were obtained using direct push drilling methods to collect soil core in five-foot lengths. A new polyvinyl chloride liner was used in the core barrel for collection of each soil core. Reusable drill tooling (steel) was decontaminated between each test boring (**Section 3.4**).

Eight primary chemical samples were collected from four test borings. Two test borings were located at reported AFFF release source areas (TH102 at the FTA and TH103 at the ARFF source areas). The remaining two test borings (TH101 and TH104) were advanced near the northeast FAI property line to assess potential migration of PFAS contamination from the City of Fairbanks FTA onto FAI property. **Appendix G** contains sample and data summaries for samples collected during this investigation. **Table 3-1** and **Drawing A-09** present summarized soil data from this investigation.

3.2.1 PFBS, PFHPA, PFHXS, AND PFNA SOIL RESULTS

ADEC does not have published cleanup levels for analytes PFBS, PFHpA, PFHxS, and PFNA (ADEC, 2018a). For analysis, 10 times the associated water action levels were used for comparison (ADEC, 2018b). One or more of the analytes PFBS, PFHpA, PFHxS, and PFNA exceeded 10 times the water action level in samples from two source area test borings (TH102 and TH103).

3.2.2 PFOA AND PFOS SOIL RESULTS

PFOS and PFOA exceeded ADEC cleanup levels (3,000 and 1,700 ng/kg, respectively) in samples from the FTA source area test boring at up to 3,000,000 and 42,000 ng/kg, respectively. PFOA also exceeded the cleanup level in samples from the ARFF source area test boring (TH103) at 2,500 ng/kg.

Results for soil samples from the two test boings along the northeast boundary were below cleanup levels.

3.3 HORIZONTAL SURFACE WATER AND GROUNDWATER SAMPLING AND RESULTS

Surface water samples were collected by directly sampling with the sampling container (dip method) or by using a peristaltic pump with disposable high density polyethylene (HDPE) tubing (where steep banks presented safety concerns).

The following sections generally discuss PFAS compound results for surface water and groundwater samples from Phase I and Phase I/II investigation. Summarized results are provided in tabular format in **Tables 3-2 through 3-5** and in **Appendix G**. Summarized results are shown spatially, per analyte, on **Drawings A-10 through A-16**.

3.3.1 PFBS WATER RESULTS

PFBS was detected above the 2,000 ng/L action level in the upper sample from the FTA source area (TW101) at 9,000 ng/L and above 50 percent of the action level at 1,300 ng/L for the sample from MW30R. This analyte was below the action level in remaining project samples.

3.3.2 PFHpA, PFHxS, PFNA, PFOS, AND PFOA WATER RESULTS

Based on the 2018 ADEC Technical Memorandum (ADEC, 2018b) these analytes are considered in aggregate (five PFAS summation) for comparison with the 70 ng/L action level.

3.3.3 FIVE PFAS WATER SUMMATION RESULTS

Five PFAS summation results were calculated by summing the individual results for PFHpA, PFHxS, PFNA, PFOS, and PFOA. If an individual analyte was not detected, the limit of detection (LOD) was used in the calculation (ADEC, 2018b, and ADEC, 2012). Five PFAS summation results exceeded the action level in samples from 25 of 44 temporary monitoring wells or existing monitoring wells and four surface water locations. Eight temporary monitoring wells or existing monitoring wells and one surface water location samples were above 50 percent of the action level between 35 and 62 ng/L.

3.4 DECONTAMINATION

Disposable nitrile gloves were used to isolate the sampler from sample media. Gloves were changed at least between each sample and often multiple times whenever contact was made with items identified with potential for cross-contamination (e.g. field notebook, clothing, the ground, etc.). Disposable spoons were used to collect soil samples. Disposable HDPE tubing was used to collect groundwater and some surface water samples via a peristaltic pump. A disposable six-inch long section of silicon tubing was used to allow the peristaltic pump to function. Disposable sampling elements were used once and then discarded. Drill tooling used to collect soil and groundwater samples was decontaminated via wet methods (alconox wash followed by two rinses) between each test boring.

3.5 INVESTIGATION DERIVED WASTE

In accordance with the approved Work Plan, as long as miscellaneous solid wastes were not grossly impacted (e.g. significant amounts of soil adhered to disposable sampling spoons) with potentially contaminated material, disposal would be to the locally permitted sanitary landfill. Miscellaneous solid wastes, such as personnel protective equipment and disposable sampling equipment, were temporarily stored in the appropriate waste receptacles at FAI. Final disposal of the materials was at the local permitted sanitary landfill.

Waste water investigation derived waste (IDW) from purging and decontamination activities were containerized in four 55-gallon drums, labelled, and stored near the FTA. In accordance with the approved Work Plan, FAI will arrange disposal method, location, and time.

TABLE 3-1: SUMMARIZED SOIL CHEMICAL SAMPLE RESULTS

Location	Sample Number ²	Sample Depth (feet bgs)	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA		
			Cleanup Level ¹ (ng/kg)							
			None Assigned						3,000	1,700
TH101	FAI18-TH101-01	1.0 to 2.0	220 U	240 U	86 J	240 U	1,600	240 U		
	FAI18-TH101-02	5.0 to 6.0	220 U	250 U	250 U	250 U	620 U	250 U		
TH102	FAI18-TH102-01	1.0 to 1.5	2,600	1,300	41,000	250 J	130,000	5,500		
	FAI18-TH102-02		290 J	270 J	7,600	190 J	100,000	2,300		
	FAI18-TH102-03	4.0 to 5.0	31,000	7,500	410,000	820 J	3,000,000 J	42,000		
TH103	FAI18-TH103-01	1.0 to 2.0	180 U	200 U	260 J	200 U	1,800	210 J		
	FAI18-TH103-02	6.5 to 7.5	190 U	210 U	4,400	210 U	520 U	2,500		
TH104	FAI18-TH104-01	0.8 to 1.4	220 U	240 U	240 U	240 U	600 U	240 U		
	FAI18-TH104-02	5.3 to 5.8	250 U	270 U	270 U	270 U	680 U	270 U		

NOTES:

For definitions, see the Acronyms and Abbreviations table.

Non-detect results are displayed as LOD followed by a “U” flag.

Data flags (i.e. J, etc) are defined in the DQA provided in Appendix H or in the chemical data summary provided in Appendix G.

Results with a detected concentration greater than 1/2 but below an ADEC cleanup level are highlighted blue and are in **BOLD** text.

Results with a detected concentration exceeding an ADEC cleanup level are highlighted red and are in **BOLD** text.

PFBS, PFHpA, PFHxS, PFNA, concentrations exceeding 10 times the associated groundwater action level (700 for PFHpA, PFHxS, and PFNA or 20,000 for PFBS) are highlighted orange and are in **BOLD** text.

- Cleanup levels are based on 18 AAC 75 (ADEC, 2018a).
- Duplicate samples are shaded grey.

TABLE 3-2: SUMMARIZED SURFACE WATER CHEMICAL SAMPLE RESULTS

Location	Sample Number ²	Sample Depth (feet bws)	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA	Five PFAS Summation ³	
			Action Level ¹ (ng/L)							
			2,000	See Five PFAS Summation ³						70
SW101	FAI18-SW101	0.5	0.83 U	1.2 U	0.61 J	1.2 U	2.5 U	1.2 U	6.7	
SW102	FAI18-SW102	0.5	0.81 U	1.2 U	0.54 J	1.2 U	2.4 U	1.2 U	6.5	
SW103	FAI18-SW103	0.5	0.84 U	1.3 U	0.54 J	1.3 U	2.5 U	1.3 U	6.9	
	FAI18-SW118		0.88 U	1.3 U	0.53 J	1.3 U	2.6 U	1.3 U	7.0	
SW104	FAI18-SW104	0.5	7.1	9.0	39	3.8	210	14	280	
SW105	FAI18-SW105	0.5	3.8	2.3	13	0.89 J	31	4.3	51	
SW106	FAI18-SW106	0.5	61	10	250	1.2 U	230	96	590	
	FAI18-SW117		65	11	230	1.3 U	230	99	570	
SW107	FAI18-SW107	0.5	14	9.3	82	1.1 J	130	9.1	230	
SW108	FAI18-SW108	0.5	4.0	3.5	37	0.55 J	55	7.2	100	
SW109	FAI18-SW109	0.5	0.94 J	0.86 J	4.5	1.2 U	3.0 J	3.1	13	
SW110	FAI18-SW110	0.5	1.2 J	1.2 U	7.6	1.2 U	11	0.96 J	22	
SW111	FAI18-SW111	0.5	0.59 J	1.2 U	3.0	1.2 U	4.4	0.86 J	11	
SW112	FAI18-SW112	0.5	1.1 J	1.5 J	2.9	1.2 U	5.9	1.8	13	
SW113	FAI18-SW113	0.5	7.5	0.74 J	2.9	1.3 U	2.5 J	2.4	9.8	
SW114	FAI18-SW114	0.5	0.82 J	0.83 J	3.5	1.3 U	2.9 J	2.1	11	
SW115	FAI18-SW115	0.5	0.88 U	1.3 U	0.58 J	1.3 U	2.6 U	1.3 U	7.1	
SW116	FAI18-SW116	0.5	0.86 U	1.3 U	0.67 J	1.3 U	2.6 U	1.3 U	7.2	
SW201	FAI18-SW201-01	0.5	0.95 UJ	1.4 UJ	1.6 J,-	1.4 UJ	1.2 J-	1.4 UJ	7.0 J-	

NOTES:

For definitions, see the Acronyms and Abbreviations table.

Non-detect results are displayed as the LOD followed by a “U” flag.

Data flags (i.e. J, etc) are defined in the DQA provided in Appendix H or in the chemical data summary provided in Appendix G.

Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in **BOLD** text.

Results with a detected concentration exceeding an ADEC action level are highlighted red and are in **BOLD** text.

- Action levels are based on the ADEC technical memorandum on action levels for PFAS in groundwater and drinking water (ADEC, 2018b).
- Duplicate samples are shaded grey.
- Five PFAS Summation is the summation of PFHpA, PFHxS, PFNA, PFOS, and PFOA, where non-detects are encountered the LOD is included in the summation.

TABLE 3-3: SUMMARIZED PHASE I TMW GROUNDWATER CHEMICAL SAMPLE RESULTS

Location	Sample Number ²	Sample Depth (feet bgw)	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA	Five PFAS Summation ³		
			Action Level ¹ (ng/L)								
			2,000	See Five PFAS Summation ³					70		
TW101	FAI18-TW101-05	1.4	4,600	3,200	48,000 J	900	420,000 J	7,600	480,000 J		
	FAI18-TW101-07		9,000	3,000	57,000 J	910	660,000 J	7,400	740,000 J		
	FAI18-TW101-04	11.4	140	10	310	2.9	4,000	36	4,400		
	FAI18-TW101-03	36.4	9.5 J	2.8	48 J	0.73 J	810	6.4	870 J		
	FAI18-TW101-02	76.4	3.1	1.3 J	24	0.56 J	530	2.9	560		
	FAI18-TW101-01	116.4	1.8	0.75 J	15	1.30 U	310	1.8	330		
	FAI18-TW101-06		1.8	0.79 J	16	0.44 J	330	1.9	350		
TW102	FAI18-TW102-01	1.5	2.5	1.3 U	4.5	1.3 U	2.6 U	0.71 J	10		
TW103	FAI18-TW103-01	1.6	35	24	990	1.2 U	140	180	1,300		
TW104	FAI18-TW104-01	1.4	200 J	430	1,700	16	390	710	3,200 J		
TW105	FAI18-TW105-01	1.5	33	30	300	1.3 U	980	47	1,400		
TW106	FAI18-TW106-01	1.7	2.5 J	1.3 UJ	13 J	1.3 UJ	12 J	14 J	42 J		
TW107	FAI18-TW107-01	1.4	71	18	460	1.3 U	30	210	720		
TW108	FAI18-TW108-01	1.5	13	2.3	240	1.3 U	15	24	280		
TW109	FAI18-TW109-01	1.6	6.1	6.5	140	0.87 J	45	12	200		
TW110	FAI18-TW110-01	1.5	77	1.6 J	67	1.3 U	0.96 J	3.8	75		
TW111	FAI18-TW111-01	2.3	120	19	120	1.3 U	7.6	18	170		
TW112	FAI18-TW112-01	2.0	1.6 J	0.68 J	3.3	1.3 U	4.2	0.83 J	10		
TW113	FAI18-TW113-01	1.2	2.4	1.1 J	2.1	1.2 U	1.6 J	0.70 J	6.7		
TW114	FAI18-TW114-01	1.5	0.57 J	1.2 U	1.1 J	1.2 U	6.2	1.2 U	11		
TW115	FAI18-TW115-05	1.3	26	20	170	2.5	1,600	27	1,800		
	FAI18-TW115-04	26.8	14	7.8	69	1.8	440	17	540		
	FAI18-TW115-03	52.3	9.6	4.9	43	1.4 J	340	13	400		
	FAI18-TW115-02	90.3	0.89 J	1.3 U	3.2	1.3 U	15	2.3	23		
	FAI18-TW115-06		1.1 J	1.3 U	3.5	1.3 U	18	2.1	26		
	FAI18-TW115-01	117.9	0.88 U	1.3 U	0.98 J	1.3 U	4.6	0.95 J	9.1		
TW116	FAI18-TW116-01	1.6	2.7	2.9	15	1.3 U	9.9	7.6	37		
TW117	FAI18-TW117-01	1.8	14	1.8	16	1.3 U	4.4	4.0	28		
TW118	FAI18-TW118-01	1.3	20	2.5	13	1.3 U	2.6 U	1.1 J	21		
TW119	FAI18-TW119-01	0.6	12	1.2 J	27	1.3 U	2.6 U	7.6	40		
TW120	FAI18-TW120-07	2.4	2.4 J	1.0 J	13 J	1.3 UJ	5.7 J	14 J	35 J		
	FAI18-TW120-04	15.4	2.7	0.89 J	17	1.3 U	5.9	16	41		
	FAI18-TW120-03	39.4	4.5	1.1 J	28	1.3 U	8.0	22	60		
	FAI18-TW120-02	80.4	0.80 J	1.3 U	5.1	1.3 U	2.2 J	4.8	15		
	FAI18-TW120-01	115.4	0.72 J	1.4 U	1.3 J	1.4 U	1.7 J	2.4	8.2		
	FAI18-TW120-05		0.94 U	1.4 U	1.4 J	1.4 U	2.4 J	2.8	9.4		
	FAI18-TW120-06		0.88 U	1.3 U	1.3 J	1.3 U	1.0 J	2.0	6.9		
TW121	FAI18-TW121-01	0.5	2.2 J	5.7	12	1.3 J	4.8 J	7.0	31		
TW122	FAI18-TW122-01	1.2	190	30	21	18	52	70	190		
TW123a	FAI18-TW123-01	2.0	7.2	6.8	32	1.3 U	14	5.9	60		
TW124	FAI18-TW124-01	1.2	5.7	9.4	41	1.6 J	35	15	100		
TW125	FAI18-TW125-01	1.6	1.2 J	1.4 J	4.7	1.8 U	2.7 J	1.9 J	13		
TW126	FAI18-TW126-01	2.1	1.7	3.0	28	1.3 U	1.0 J	6.0	39		
TW127	FAI18-TW127-01	1.5	4.2	1.3 U	3.6	1.3 U	2.5 U	1.0 J	9.7		
TW128	FAI18-TW128-01	2.4	2.5 J	7.9 J	18 J	1.3 UJ	19 J	16 J	62 J		
TW129	FAI18-TW129-01	1.7	40 J	7.0 J	140 J	1.3 UJ	2.6 UJ	10 J	160 QN		
TW130	FAI18-TW130-01	1.3	290	120	3,600	1.2 U	2.5 U	1,900	5,600		
	FAI18-TW130-02		430	130 J	5,000 J	1.3 U	1.2 J	2,800 J	7,900 J		

NOTES:

For definitions, see the Acronyms and Abbreviations table.

Non-detect results are displayed as the LOD followed by a “U” flag.

Data flags (i.e. J, etc) are defined in the DQA provided in Appendix H or in the chemical data summary provided in Appendix G.

Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in **BOLD** text.

Results with a detected concentration exceeding an ADEC action level are highlighted red and are in **BOLD** text.

1. Action levels are based on the ADEC technical memorandum on action levels for PFAS in groundwater and drinking water (ADEC, 2018b).
2. Duplicate samples are shaded grey and replicate samples are highlighted light green.
3. Five PFAS Summation is the summation of PFHpA, PFHxS, PFNA, PFOS, and PFOA, where non-detects are encountered the LOD is included in the summation.

TABLE 3-4: SUMMARIZED PHASE I EXISTING MONITORING WELL CHEMICAL SAMPLE RESULTS

Location	Sample Number ²	Sample Depth (feet bgw)	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA	Five PFAS Summation ³
			Action Level ¹ (ng/L)						
			2,000	See Five PFAS Summation ³					70
MW15	FAI18-MW15	1.5	4.9	1.2 J	20	1.4 U	9.7	4.2	37
	FAI18-MW38		5.0	1.3 J	20	1.4 U	10	4.6	37
MW18	FAI18-MW18	2.0	13	11	54	1.3 U	22	47	140
MW30R	FAI18-MW30R	0.5 to 2.0	1,300	120	1,200	1.4 U	5.4	310	1,600
MW34	FAI18-MW34	1.5	7.1	4.6	67	1.3 U	50	25	150

NOTES:

For definitions, see the Acronyms and Abbreviations table.

Non-detect results are displayed as the LOD followed by a “U” flag.

Data flags (i.e. J, etc) are defined in the DQA provided in **Appendix H** or in the chemical data summary provided in **Appendix G**.

Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in **BOLD** text.

Results with a detected concentration exceeding an ADEC action level are highlighted red and are in **BOLD** text.

1. Action levels are based on the ADEC technical memorandum on action levels for PFAS in groundwater and drinking water (ADEC, 2018b).
2. Duplicate samples are shaded grey.
3. Five PFAS Summation is the summation of PFHpA, PFHxS, PFNA, PFOS, and PFOA, where non-detects are encountered the LOD is included in the summation.

TABLE 3-5: SUMMARIZED PHASE II/III TMW GROUNDWATER CHEMICAL SAMPLE RESULTS

Location	Sample Number ²	Sample Depth (feet bgw)	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA	Five PFAS Summation ³
			Action Level ¹ (ng/L)						
			2,000	See Five PFAS Summation ³					70
TW202	FAI18-TW202-01	1.4	1.1 J	4.9	4.0	1.3 U	3.5	2.0	16
TW207a	FAI18-TW207-01	1.5	1,300 U	1,900 U, Q	780 J	1,900 U, Q	3,800 U, Q	1,900 U, Q	10,000 J, Q
	FAI18-TW207-03		110 J-	16 J-	850 J	100 Q	130 J-	180 J-	1,300 J
	FAI18-TW207-02	22.6	1,300 U	1,900 U, Q	670 J	1,900 U, Q	3,800 U, Q	1,900 U, Q	10,000 J, Q
TW208a	FAI18-TW208-01	17.2	41	5.4	120	1.3 U	410	18	550
TW210a	FAI18-TW210-01	3.9	21	5.3	60	0.71 J	91	8.6	170
TW211	FAI18-TW211-01	25.1	6.5	3.2	21	0.96 J	82	7.6	110
TW216	FAI18-TW216-01	0.9	1,300 U, Q	1,900 U, Q	530 J	1,900 U, Q	3,800 U, Q	1,900 U, Q	10,000 J, Q
	FAI18-TW216-02		1,300 U, Q	1,900 U, Q	640 J	1,900 U, Q	3,800 U, Q	1,900 U, Q	10,000 J, Q
TW218a	FAI18-TW218-01	1.4	7.9	0.79 J	15	1.3 U	2.7 J	2.7	22
	FAI18-TW218-02	13.0	14	1.8	15	1.3 U	11	4.1	33
TW219	FAI18-TW219-01	0.9	11	3.2	61	1.3 U	150	17	230
	FAI18-TW219-02	27.8	16.0	4.70	77	1.60 U	530	17.0	630
TW302a	FAI18-TW302-01	2.8	5.3 J-	33 J-	2.0 J-	1.3 UJ	24 J-	8.3 J-	80 J-
	FAI18-TW302-02	19.3	9.2 J-	7.0 J-	99 J-	1.3 UJ	100 J-	27 J-	230 J-
TW310	FAI18-TW310-01	1.7	14 J	10 J	130 J	1.3 UJ	100 J	73 J	310 J
	FAI18-TW310-02	23.2	92	21	710	1.3 U	990	240	2,000

NOTES:

For definitions, see the Acronyms and Abbreviations table.

Non-detect results are displayed as the LOD followed by a “U” flag.

Data flags (i.e. J, etc) are defined in the DQA provided in **Appendix H** or in the chemical data summary provided in **Appendix G**.

Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in **BOLD** text.

Results with a detected concentration exceeding an ADEC action level are highlighted red and are in **BOLD** text.

1. Action levels are based on the ADEC technical memorandum on action levels for PFAS in groundwater and drinking water (ADEC, 2018b).
2. Duplicate samples are shaded grey.
3. Five PFAS Summation is the summation of PFHpA, PFHxS, PFNA, PFOS, and PFOA, where non-detects are encountered the LOD is included in the summation.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Samples were collected by a QEP, as defined in 18 AAC 75 regulations (ADEC, 2018a). Data quality review was conducted by the project chemist to evaluate whether field measurements and analytical methods were performed according to method and project specifications and to qualify data affected by sample-handling or analytical anomalies.

Data quality review involved the evaluation of documentation and analytical reports associated with selected samples or groups of samples. Data review followed 18 AAC 75 (ADEC, 2018a), ADEC Site Characterization Work Plan and Reporting Guidance of Investigation of Contaminated Sites (ADEC,2017b), ADEC Technical Memorandum on Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling (ADEC, 2017c), and ADEC Guidelines for Data Reporting, Data Averaging and Treatment of Non-detect Values (ADEC, 2012). Chemical data LOD sensitivities were compared to the most stringent cleanup levels published in 18 AAC 75 (ADEC, 2018a). Findings are provided in the DQA (**Appendix H**). The DQA was prepared by the project chemist, Rodney Guritz, of Arctic Data Services, LLC (ADS) in Fairbanks, Alaska.

Samples were maintained at 0 to 6 degrees Celsius (°C) under standard chain-of-custody procedures until delivery or shipment to the analytical laboratory. R&M shipped samples to TA-Sacramento under strict chain-of-custody procedures. Laboratory check-in and holding time information are summarized in **Table 4-1**.

TABLE 4-1: COOLER CHECK-IN AND HOLDING TIME INFORMATION

Analytical Laboratory	Cooler Name	Samples Analyzed Within Holding Time	ADEC Temperature Range (°C)	Check-In Temperature (°C)
TA-Sacramento	Barium	Yes	0 to 6	3.5
	Zinc	Yes	0 to 6	2.1
	Gold	Yes	0 to 6	5.4
	Silver	Yes	0 to 6	4.5
	Lead	Yes	0 to 6	1.9
	Cadmium	Yes	0 to 6	5.2

NOTES:

For definitions, see the Acronyms and Abbreviations table.

4.1 DATA QUALITY ASSESSMENT

Precision, accuracy, representativeness, comparability, and completeness were deemed acceptable, and the data are usable for the purposes of this project, as qualified. Project sample results affected by the QC anomalies described in the DQA have been flagged accordingly throughout this report. Qualified results should be used with caution when comparing against cleanup levels or other decision-making criteria. The review by ADS was based solely on information provided by the analytical laboratory in the laboratory reports for the sample delivery groups (SDG) reviewed. ADS did not review instrument-level QC elements, such as calibration verification or internal standard response, except to the extent that the laboratory identified instrument-level anomalies in the case

narrative. ADS did not conduct independent validation of the data (e.g. recalculating results based on instrument responses) or review any raw chemical data (e.g. chromatograms).

Summary tables which list all samples that were qualified or rejected and the associated data quality implications or qualifications are included in the DQA and qualifications are reflected in the data tables and drawings included with this report. Data qualifiers used for this report, along with definitions, are included in **Table 4-2**.

TABLE 4-2: QUALIFIER DEFINITIONS

Qualifier	Definition
U	The analyte was not detected and is reported as less than the LOD (laboratory qualifier).
J	Estimated concentration; analyte was detected between the detection limit and the LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias (laboratory qualifier).
J+	Estimated concentration (high bias); analyte was detected and was affected by QC failures or sample handling and preservation anomalies indicative of a potential high bias.
J-	Estimated concentration (low bias); analyte was detected and was affected by QC failures or sample handling and preservation anomalies indicative of a potential low bias.
UJ	The analyte was not detected and is reported as less than the LOD; however, the associated numerical value is an estimate, and there is uncertainty whether the absence of detected analyte is valid at the listed value due to QC failures or sample handling and preservation anomalies.
UB	The result is considered not detected above the listed numerical value due to contamination identified at a similar concentration in a corresponding blank sample.
B	The analyte was detected above the LOQ but may be affected by blank-associated sample contamination (biased high).
NJ	Tentative detection, estimated concentration; there is significant uncertainty in the identity and quantity of the detected analyte.
N	Tentative detection; there is significant uncertainty in the identity of the detected analyte.
Q	The sample result was affected by serious deficiencies in the ability to meet published method or project QC criteria. The presence or absence of the analyte cannot be verified. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended. (qualifier applied during data validation)
R	The sample result was affected by serious deficiencies in the ability to meet published method or project QC criteria. The presence or absence of the analyte cannot be verified. The project team has determined that the result is not usable for project decision-making purposes. (qualifier applied during data usability assessment)

NOTES:

For definitions, see the Acronyms and Abbreviations table.
 Not all potential qualifiers were used for data presented by this report.

4.2 QUALITY CONTROL SAMPLING

QC samples included the following samples:

- Three vertical cross-contamination replicate samples (3 locations)
- One soil primary/duplicate pair (8 primary samples)
- Eight water primary/duplicate pairs (78 primary samples)
- Five rinsate blank samples

4.2.1 REPLICATE SAMPLING

In addition to trip blank and duplicate samples, replicate samples were collected from the three vertical delineation locations (TW101, TW115a, and TW120). This involved purging an additional seven times the volume of the screened portion of the TMW following collection of a primary sample. This additional procedure was performed to test the potential for contamination being dragged down during installation of the temporary well. This could occur from soil being caught in the seam between the expendable drive shoe and the sample screen. If this occurred and any contaminated soil was not removed by the standard purging procedure, the results could be biased high due to influence from soil introduced from a shallower depth. By performing additional purging followed by a second sample at the same depth, the data were able to be assessed for drag down contamination. If the primary and replicate samples meet duplicate QC criteria (30 percent difference) for water matrix samples, no cross-contamination will be interpreted as present. If a primary/replicate sample pair results exceed 30 percent difference, all results for that analyte at that test location will be flagged as high biased (J+) and would be considered for rejection and exclusion from the data set (Q flag). In some instances the flags may not be applied, such as if both results are low and near the limit of quantification (LOQ). In this case, especially if one or both are estimated results (J flagged), a small difference in concentration (typically less than 1 ng/L) may result in a large percent difference (typically 30 to 100 percent). The large percent difference, in this case, is not considered to represent a real condition and no flags will be applied. Comparison of replicate and primary samples are presented below.

TABLE 4-3: SHALLOW CONTAMINANT VERTICAL STRATIFICATION

Analyte	TW101 ^{1,2}			TW115a ^{1,2}			TW120 ^{1,2}		
	Primary	Replicate	% Diff	Primary	Replicate	% Diff	Primary	Replicate	% Diff
PFBS	1.8	1.8	0	0.89 J	1.1 J	21	Not Assessed ³		
PFHpA	0.75 J	0.79 J	5	Not Assessed ³			Not Assessed ³		
PFHxS	15	16	6	3.2	3.5	9	1.3 J	1.3 J	0
PFNA	Not Assessed ³								
PFOS	310	330	6	15	18	18	1.7 J	1.0 J	52
PFOA	1.8	1.9	5	2.3	2.1	9	2.4 J	2.0 J	18

NOTES:

For definitions, see the Acronyms and Abbreviations table.

1 See **Appendix G** and tables in Section 3.0 present complete results.

2 Results are presented in ng/L and are rounded to two significant digits in accordance with results provided by the analytical laboratory.

3 Percent difference was not collected as either both results were non-detect (U flagged) or one result was non-detect and the other was estimated (J flagged) with the estimated result less than the non-detect LOD.

Replicate/primary result percent difference analysis shows good agreement except for PFOS from TW120 with a 52 percent difference. As noted above, both results were very small and estimated (J flagged). The variance of 0.7 ng/L on an estimated result is not considered to represent a real condition and the results were not flagged. Agreement on remaining samples range from 0 to 21 percent difference. Replicate results are both higher and lower than the primary for various analytes. This provides additional evidence that the variation is a result of the error inherent to the analytical method, and not an indication of contamination being dragged down during sampling, or dragged down contamination being released to a sample as a result of the additional sampling. These data indicate that the vertical sampling procedure produced usable data.

4.2.2 DUPLICATE AND RINSATE BLANK SAMPLING

Duplicate samples and analysis are discussed in detail in the DQA provided in **Appendix H**. Duplicate results met the ADEC 30 percent relative percent difference (RPD) for water matrix samples and 50 percent for soil matrix samples.

Rinsate samples were collected periodically throughout the field investigation to assess the adequacy of decontamination procedures. Rinsate blank samples had low level detections of PFHxS and PFOS analytes at levels considered to be estimated. In accordance with ADEC guidance (ADEC, 2017b and ADEC, 2017c) these low level detections are more than 10 times below the action level (70 ng/L) having been detected between 0.34 and 0.57 ng/L for PFHxS and at 1.1 ng/L for PFOS. These rinsate data indicate that decontamination procedures during this investigation were adequate and prevented cross-contamination between investigation locations. Data are considered usable in relation to the effectiveness of project decontamination procedures.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Data and field observations generated during this investigation were analyzed to develop conclusions and recommendations related to environmental conditions at FAI and the surrounding area. This investigation provides a coarse resolution understanding of the extent and transport of PFAS contamination from past AFFF use at FAI. The large investigation area required trading higher resolution for coverage to generate a more complete picture of how PFAS are distributed and moving through the groundwater system in the area of FAI. This investigation was designed to provide a framework for planning additional investigations to refine nature and transport of PFAS contamination in identified areas of interest.

5.1 INVESTIGATION CONCLUSIONS

This discussion focuses on the summation of PFHpA, PFHxS, PFNA, PFOS, and PFOA results referred to as five PFAS summation by this report, as ADEC guidance for groundwater handles these analytes in aggregate. PFBS has a separate action level that is significantly higher (2,000 ng/L) than the five PFAS summation result (70 ng/L). PFBS only exceeded the action level at the current FTA and is not specifically discussed in this section.

5.1.1 SOURCE AREA SOIL CHARACTERIZATION

Soil samples collected from near the FTA (TH102) and ARFF (TH103) source areas indicate that a significant quantity of PFAS contamination remains available for migration to groundwater at the FTA source area. Soil sampling near the ARFF source area is less conclusive as the identified source area is larger and is not a point source like the FTA source area. Data from the ARFF source area do indicate that PFAS are present in soil above the groundwater interface, but at concentrations below the migration to groundwater cleanup level (ADEC, 2018a).

Soil samples collected from the groundwater interface at both the FTA and ARFF source areas exhibit higher concentrations of detected analytes than in the near surface samples. This indicates that PFAS contaminants migrate to groundwater relatively quickly in agreement with the release mechanism (dissolved in water to make AFFF).

5.1.2 SOURCE AREAS DESCRIPTIONS

Potential contamination source locations A, C, D, G, H, and Q (**Drawing A-03**) have been identified as the most significant and appear to represent the sources of the two largest zones exceeding the 70 ng/L five PFAS summation groundwater action level identified by this investigation (**FTA and Central Contaminated Zones**). Locations K, L, and N (**Drawing A-03**) have been identified as the sources of the two minor zones exceeding the 70 ng/L five PFAS summation groundwater action level located along the northwest end of FAI runway 2L-20R (**Fire Response and Deicing Contaminated Zones**). The identified contaminated zones exceeding the action level are presented on **Drawings A-17 and A-18** and are described below.

- **FTA Contaminated Zone**
 - Locations A, C, and D represent the **FTA Source Areas** which appear to have merged into a single zone exceeding the action level shortly down gradient from the current, former, and interim fire training areas. A decrease in PFAS analytes from TW107 (former FTA) to

TW104 (downgradient) appear to show downgradient migration from the source areas following the end of fire training activities in the area in approximately 1993. Several thousand gallons of PFAS based AFFF have been reportedly released in these areas from the 1980s through present.

- **Central Contaminated Zone**
 - Locations G and H represent the **ARFF Source Area** where more than 1,000 gallons of PFAS based AFFF have reportedly been released from the 1980s through 2007.
 - Location Q represents the **Inspection Source Area** where hundreds of gallons of PFAS based AFFF have reportedly been released from the 1980s through 2015.
 - An **Unknown Source Area** is identified in **Drawing A-17** with no defined source location. Groundwater flow interactions in this area appear complex making modeling difficult. This area with an unknown source is expected to primarily emanate from the Inspection and ARFF Source Areas. The Hangar and Engine Fire Source Areas do not appear to result from releases large enough to result in the levels of contamination in the northeastern Central Contaminated Zone. Additionally, data from SW105, TW128a, TW202, and SW115 indicate separation between the Fire Response Contaminated Zone and northeastern Central Contaminated Zone.
- **Fire Response Contaminated Zone**
 - Location K represents the **Hangar Fire Source Area** where 40 gallons of PFAS based AFFF have reportedly been released in 2013 in response to an aircraft fuel fire.
 - Location L represents the **Engine Fire Source Area** where 200 or more gallons of PFAS based AFFF have reportedly been released in 2003 in response to an aircraft engine fire. This location appears to have merged with the Hangar Fire Source Area.
- **Deicing Contaminated Zone**
 - Location N represents the **Deicing Basin Source Area** where hundreds of gallons of diluted PFAS based AFFF have reportedly been released from 1998s through 2017.

5.1.3 CONTAMINANT TRANSPORT AND GROUNDWATER FLOW CONDITIONS

Groundwater flow under the FAI area is strongly influenced by the current flood stage of the Chena and Tanana Rivers (USGS, 1996) coupled with bedrock and permafrost to the northwest that appears to act as an impermeable barrier to groundwater flow. The three flow regimes mapped by USGS in the 1996 groundwater report show a sharp northwest to southwest trend in flow direction starting northeast of FAI that completes the turn near the north corner of FAI property. Across most of FAI, groundwater flows from the southeast to northwest.

The sharp turn in groundwater flow direction along the northwest side of FAI appears closest to FAI during a high-stage Chena River and furthest during a high-stage Tanana River. Flow through the neighborhood located to the northwest of FAI on the southeast bank of the Chena River appears to fluctuate from the northwest to the southwest based on river stage. This condition appears to be most dominant on the northeast side of the Dale Road neighborhood and minimal to non-existent on the northwest side. Along with horizontal groundwater flow variance, vertical stratification of the aquifer appears to affect contaminant concentrations in groundwater.

Transport of PFAS in distal portions of the contaminated zones cannot be determined for most zones identified by this investigation. The location of the Chena River and shift in groundwater flow direction present challenges in understanding transport in distal areas. The FTA Contaminated Zone shows an initial sharp decline followed by a gradual decrease in concentration with distance (**Table 5-1 and Figure 5-1**).

TABLE 5-1: FTA CONTAMINATED ZONE FIVE PFAS SUMMATION CONCENTRATION DECREASE WITH DISTANCE

TMW Location	Approximate Distance to Current FTA Source Area (feet) ¹	PFAS Sum Result (ng/L)	Depth (feet bgw for TMW) (feet bws for SW)
TW101	130	740,000 J	1.4
SW107	390	230	0.5
TW107	1,100 (190 to interim FTA)	720	1.43
TW104	1,500 (600 to interim FTA)	3,200 J	1.42
TW216 ²	1,000	10,000 J, Q	0.9
TW105	2,600	1,400	1.54
TW103a	2,800	1,300	1.61
TW207a ²	3,100	1,300 J-	1.5
SW106 ²	5,400	590	0.5
TW129a	5,400	160	1.71
TW120	6,000	60 (35)	39.4 (2.4)

NOTES:

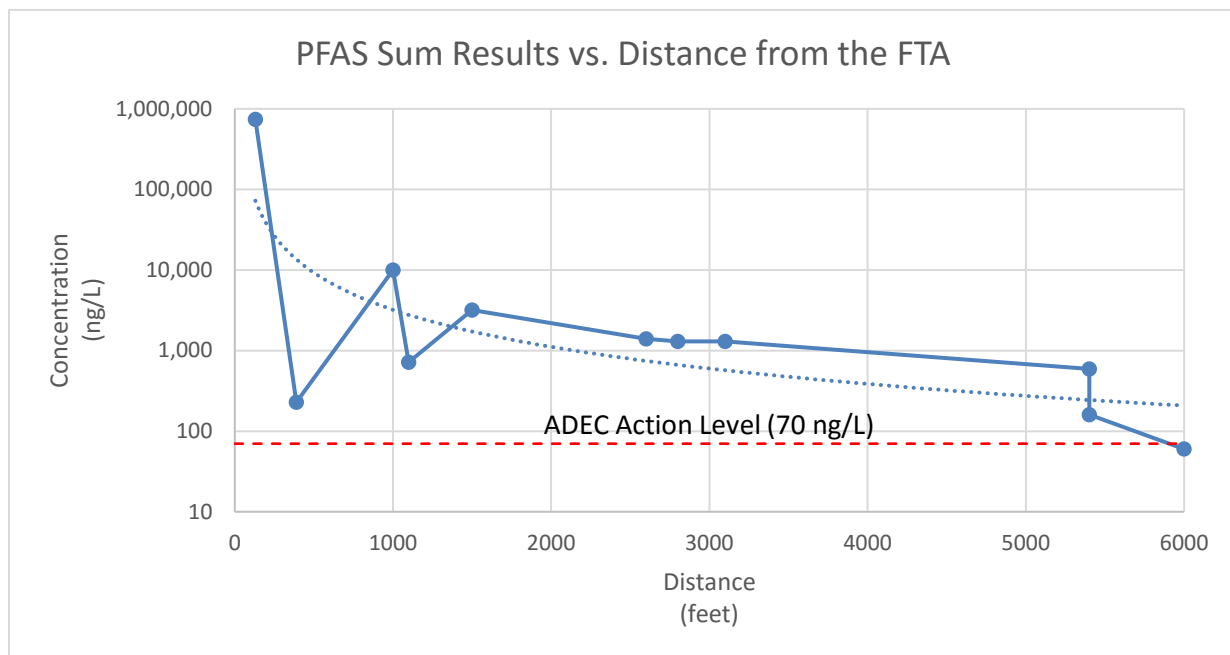
For definitions, see the Acronyms and Abbreviations table.

1 Distances and five PFAS summation concentrations are rounded to two significant digits.

2 Duplicate sample results are available at these locations. The higher result between primary and duplicate are presented. See Appendix G and tables in Section 3.0 present complete results.

Results for investigation locations downgradient of the FTA were also graphed against distance from the FTA for comparison. A logarithmic vertical scale is used due to the wide range of concentrations.

FIGURE 5-1: FIVE PFAS SUMMATION RESULT COMPARISON BY DISTANCE FROM THE FTA



5.1.4 PHASE I VERTICAL DISTRIBUTION OF CONTAMINANTS

Three groundwater investigation locations were sampled at multiple depths during Phase I to provide initial information regarding vertical distribution of PFAS contamination in the FAI aquifer and how the Chena River might affect contaminant migration. A tabular comparison of results are provided below in Table 5-2.

TABLE 5-2: VERTICAL FIVE PFAS SUMMATION RESULT COMPARISON BY DEPTH

Locations	Depth 1 Result ²	Depth 2 Result ²	Depth 3 Result ²	Depth 4 Result ²	Depth 5 Result ²
Depth (feet bgw)	1 to 3	11 to 27	36 to 52	76 to 90	115 to 118
Source Area ¹ (TW101)	740,000	4,400	870	560	330
Mid-Contaminated Area ¹ (TW115a)	1,800	540	400	26	9.1
Downgradient Periphery and Cross-River (TW120)	35	41	60	15	9.4

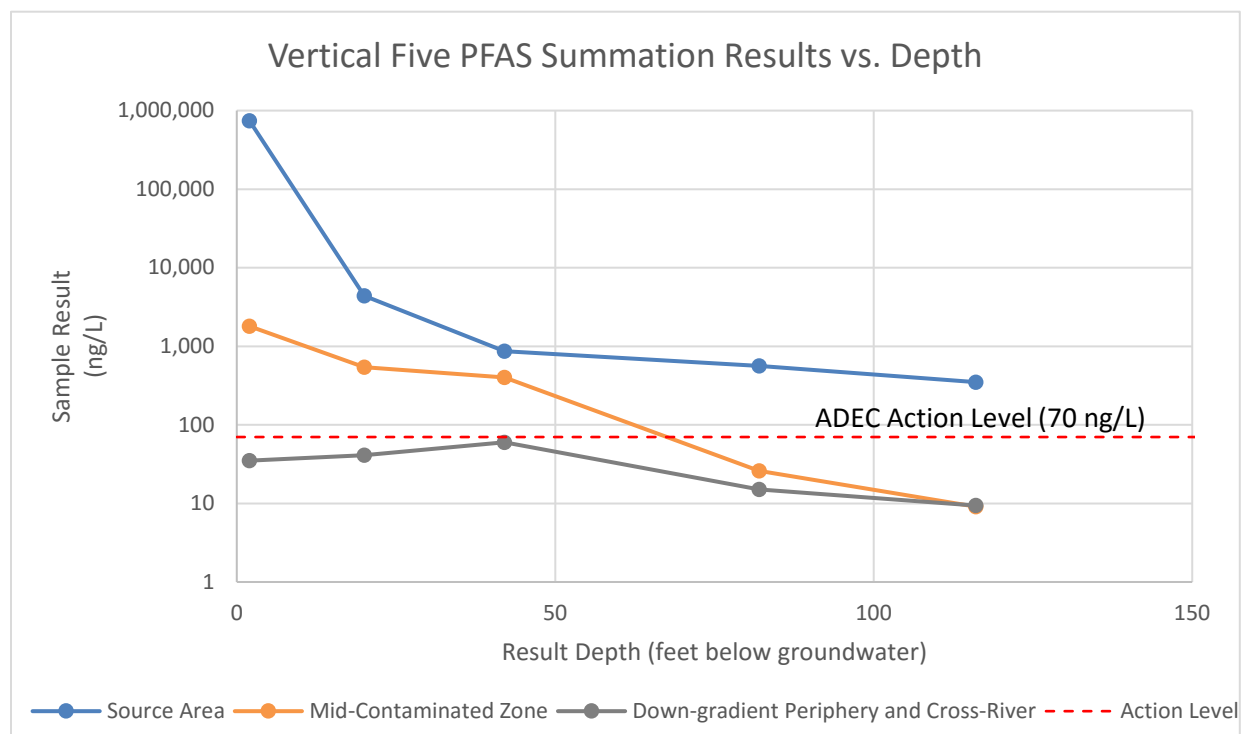
NOTES:

For definitions, see the Acronyms and Abbreviations table.

- 1 Duplicate sample results are available at these locations. The higher result between primary and duplicate are presented. See Appendix G and tables in Section 3.0 present complete results.
- 2 Results are presented in ng/L and are rounded to two significant digits in accordance with results provided by the analytical laboratory.

Results were also graphed against depth to visually assess variance with increasing depth in Figure 5-2. A logarithmic vertical scale is used due to the wide range of concentrations.

FIGURE 5-2: FIVE PFAS SUMMATION RESULT COMPARISON BY DEPTH



Discussion about the nature of PFAS migration in groundwater included whether compounds would sink in the aquifer (similar to chlorinated solvents) or float with a dissolution front extending some depth into the aquifer (similar to most petroleum hydrocarbons). The results shown above indicate that PFAS do not sink (they were in solution with water when released at FAI), but have a deep dissolution front (exceeding the 70 ng/L action level) that extends at least 116 feet into the aquifer at the source area. The concentrations at the source area and mid-contaminated zone locations drop off rapidly with depth illustrating the deep dissolution front presented by PFAS analytes.

The downgradient location across the Chena River from the source area shows a gradual increase with depth to 40 feet bgw changing to a decrease with depth from 40 to 115 feet bgw. This trend implies that the Chena River acts as a partial barrier to groundwater flow with effectiveness decreasing with depth. Localized groundwater flow likely complicates PFAS migration in this area as flow direction is expected to shift from northwest to southwest (USGS, 1996). Samples associated with this data were located where groundwater appears to have been traveling northwest at the source area and mid-contaminated zone locations and southwest at the downgradient location.

5.1.5 PHASE II SHALLOW STRATIFICATION CONDITIONS

Five PFAS summation concentrations from Phase I of this investigation in the central and north side of the Dale Road Neighborhood did not appear to correlate with results from drinking water wells in the area collected as part of the investigation discussed in **Section 2.6.1** (S&W, 2018). Drinking water results represent data from multiple depths within the aquifer. The depth data of well screens, and thus where a sample was collected, are of unknown accuracy and interval, whereas results from Phase I of this investigation were collected between 1 and 3 feet bgw (excluding the vertical delineation samples from TW101, TW115a, and TW120). Phase II sampling supplemented the Phase I data set with additional vertical data to assess discrepancies in water well sampling (S&W, 2018) and Phase I data that indicated the potential for vertical stratification of contamination. Phase II sample locations included single deeper samples (TW208a at 17 feet and TW211 at 25 feet) and paired shallow and deeper samples (TW218a at 1 and 13 feet, TW219 at 1 and 28 feet, TW310 at 2 and 23 feet, TW302a at 3 and 19 feet, and TW207a at 2 and 23 feet).

The Tanana River appears to generally control regional groundwater based on the northwest trend of groundwater flow in the area (roughly parallel to the Tanana River). Thus the Tanana River can be considered to control the full depth of the unconfined aquifer under FAI and the region to the northwest (until approaching permafrost and bedrock northwest of the Chena River). The Chena River appears to have a localized effect on the flow direction in the upper portion of the aquifer as shown by the apparent migration of where groundwater flow turns from northwest to southwest with a change in the Chena River flood stage.

The deeper samples from TW208a and TW211 show higher concentrations than the shallow samples collected nearby (TW117a and TW127) and the paired samples show a similar trend. This trend appears to indicate that groundwater flow in this area (switching from northwest to southwest with changes in Chena-Tanana river flood stage) is causing PFAS contamination to be stratified as groundwater rises and falls. During Tanana high-stage, the area would be more influenced by groundwater flowing northwest from FAI and more influenced by groundwater flowing southwest during Chena high-stage. Notably, sampling from the Phase I vertical distribution testing at the source and mid-contaminated zone locations show a significant decrease with depth. This change in flow direction may explain the increase in concentration observed with depth in the

neighborhood located northwest of FAI. Results to the southwest of the neighborhood show decreasing concentration with depth. Vertical stratification of PFAS contamination appears to be limited to the neighborhood discussed above. These results are presented from northeast to southwest in **Table 5-3** for comparison of the discussed trends.

TABLE 5-3: SHALLOW CONTAMINANT VERTICAL STRATIFICATION

Locations	Depth 1 Result ² (ng/L)	Depth 2 Result ² (ng/L)
Depth (feet bgw)	1 to 3	11 to 28
TW211	See TW127 or TW117a	110
TW127	9.7	See TW211 or TW208a
TW208a	See TW127 or TW117a	550
TW117a	28	See TW211 or TW208a
TW218a	22	33
TW219	230	630
TW310	310	2,000
TW302a	80 J-	230 J-
TW207a	1,400	670
TW115a ¹	1,800	540
TW101 ¹	740,000	4,400

NOTES:

For definitions, see the Acronyms and Abbreviations table.

1 Duplicate sample results are available at these locations. The higher result between primary and duplicate are presented. See **Appendix G** and tables in Section 3.0 present complete results.

2 Results are presented in ng/L and are rounded to two significant digits in accordance with results provided by the analytical laboratory.

5.1.6 HORIZONTAL PFAS CONTAMINATION DELINEATION

The Central Contaminated Zone is formed due to significant overlap of contamination emanating from the ARFF, Inspection, and Unknown Source Areas and is effectively a single contaminated zone in the Dale Road Neighborhood. This combined zone exceeding the action level appears to be delineated in shallow groundwater by the Chena River bordering to the west, north, and east. The south side is bound by groundwater flow moving from the south/southeast to the northwest along with investigation location results below the action level spread across the southeast side of FAI (southeast of the Float Pond).

The FTA Contaminated Zone is bound to the southwest by the Tanana River, which controls groundwater flow and TW102a with results below the action level. The south side is bound by groundwater flow moving from the south/southeast to the northwest along with investigation location results below the action level spread across the southeast side of FAI (southeast of the Float Pond and Airport Perimeter Road immediately southeast of the FTA). The northeast is bound by results from TW121 (from this investigation) and drinking water well results (S&W, 2018) below the action level.

The Fire Response and Deicing Contaminated Zones are bound to the south by groundwater flow moving from the south/southeast to the northwest along with investigation location results below the action level spread across the southeast side of FAI (southeast of the Float Pond). The northwest side appears to be bound by results from TW128a, SW105, TW202, and SW115 below the action level. Vertical stratification of groundwater due to changes in groundwater flow direction may be causing contamination to migrate to the northwest at depth under the locations of TW128a, SW105, TW202, and SW115 and into the Dale Road Neighborhood. The north and northeast are bound by groundwater flow direction.

5.1.7 MIGRATION OF THE CITY OF FAIRBANKS REGIONAL FIRE TRAINING CENTER PLUME

Three TMW (groundwater) and two test borings (soil) were advanced along the northeast FAI property boundary to investigate potential migration of contamination from the City of Fairbanks Regional Fire Training Center PFAS Source Area (**City Plume**) onto FAI property. This plume is being investigated separate to this investigation by ADEC and the City of Fairbanks. Results from soil and groundwater appear to show that the City Plume is reaching FAI at the northeast property boundary, but is dissipating with distance to the northwest. These sentry locations are downgradient and slightly crossgradient from the City Plume based on USGS groundwater mapping (USGS, 1996). Applicable results are shown below along with approximate distance from the City Source Area.

TABLE 5-4: CITY SOURCE AREA AND FAI SENTRY LOCATION RESULTS

Approximate Distance to the City Source Area	TMW or Test Boring Location	Five PFAS Summation(Water) PFOS/PFOA (Soil)	Depth (bgw for TMW) (bgs for Test Borings)
7,200 feet	TW122a (water)	190 ng/L	1.2 feet bgw
	TH101 (soil)	1,600 ng/L / Non-detect	1.0 to 2.0 feet bgs
		Non-Detect / Non-Detect	5.0 to 6.0 feet bgs
9,900 feet	TW124a (water)	100 ng/L	1.2 feet bgw
	TH104 (soil)	Non-Detect / Non-Detect	0.8 to 1.4 feet bgs
		Non-Detect / Non-Detect	5.3 to 5.8 feet bgs
12,900 feet	TW123a (water)	60 ng/L	2.0 feet bgw

NOTES:

For definitions, see the Acronyms and Abbreviations table.

5.2 IDENTIFIED DATA GAPS

Several data gaps related to horizontal and vertical delineation, groundwater flow (contaminant migration), and contaminant source were identified during data analysis and are discussed below.

5.2.1 FTA SOURCE AREA VERTICAL DELINEATION

Vertical characterization sample results from TW101 exceeded the five PFAS summation action level to the depth explored (116 feet below groundwater). The five PFAS summation result at 116 feet below groundwater was 330 ng/L, significantly exceeding the 70 ng/L action level. Attenuation of

the vertical extent of PFAS contamination with distance from the source area is also unknown. The depth of PFAS vertical migration into the aquifer has not been delineated.

5.2.2 SOURCE AREA VERTICAL DELINEATION

Vertical extent of contamination at the ARFF, Inspection, Hangar Fire, Engine Fire, and Deicing Source Areas has not been determined. The ARFF and Inspection Source Areas are expected to be relatively deep (greater than 50 feet) based on results at the FTA Source Area and at the mid-contaminated zone vertical delineation location (TW115a). Hangar Fire, Engine Fire, and Deicing Source Areas are expected to be shallower in extent due to the magnitude of PFAS releases at those locations.

5.2.3 HORIZONTAL CONTAMINATED ZONE DELINEATION

The areas north and northeast of the Deicing Contaminated Zone are not bound by chemical data but by the assumption that contamination will not migrate that direction based on groundwater flow direction. The area to the northeast may be complicated by influence of the City Plume that appears to be migrating into the area. The Central and Fire Response Contaminated Zones are also not well delineated horizontally (especially on FAI). At locations on FAI, additional upgradient horizontal delineation is not expected to provide information that would significantly increase understanding of contaminant migration. Additional downgradient horizontal delineation would likely provide better understanding as discussed in **Section 5.2.6**.

5.2.4 UNKNOWN SOURCE AREA AND CENTRAL CONTAMINATED ZONE MIGRATION AND EXTENT

Groundwater flow in the northeastern portion of Central Contaminated Zone attributed to the ARFF, Inspection, and Unknown Source Areas is not well understood and is likely complex and highly variable based on the current flood stage of the Chena and Tanana Rivers. Data from this investigation indicate contamination stratification with depth that appears to vary over time. A vertical gradient in groundwater flow may be present and may interact with the change in horizontal flow direction to explain the distribution of PFAS contamination in this area.

5.2.5 UNKNOWN SOURCE AREA

The source location for the northeastern portion of Central Contaminated Zone has not been identified. The Hangar Fire, Engine Fire, and Deicing Source Areas are positioned upgradient, but data from TW128a, SW105, TW202, and SW115 indicate a gap between the contaminated zone and the likely sources. This condition may relate to the data gap discussed in **Section 5.2.3** and vertical stratification as discussed in **Section 5.1.5**.

5.2.6 CENTRAL, FIRE RESPONSE, AND DEICING CONTAMINATED ZONES DOWN GRADIENT MIGRATION

Contamination from these zones appear to turn towards the southwest as they reach the Chena River. This migration pattern agrees with groundwater flow mapping showing a shift from the northwest to southwest in this area. TW113a and TW114a did not detect PFAS analytes at concentrations expected given the magnitude of contamination at the source areas. As observed in vertical delineation samples from TW120, the Chena River appears to affect shallow groundwater migration across the main channel. Contaminated may be present on the northwest side of the

Chena River deeper in the aquifer based on the vertical profile of PFAS concentrations from TW120 groundwater samples.

5.3 RECOMMENDATIONS

R&M provides the following recommendations regarding COPC for FAI:

- The six PFAS analytes (PFBS, PFHpA, PFHxS, PFNA, PFOS, and PFOA) should be maintained as contaminants of concern (COC) for the Site.

R&M provides the following recommendations regarding IDW disposal:

- Containerized waste water IDW should be disposed by an ADEC approved waste contractor and should be assumed to contain petroleum hydrocarbon as well as PFAS contaminants due to the presence of multiple existing ADEC listed contaminated sites within the investigation area. There are four waste water 55-gallon drums.

R&M provides the following recommendations regarding further investigation of PFAS contamination related to AFFF use at FAI:

- Investigate the data gaps identified in **Section 5.2**.
- Design and install a long-term groundwater monitoring well and surface water sampling network to monitor contamination associated with the various PFAS source areas over time and in coordination with ADEC.
- Consider targeted source area remediation of soil and/or groundwater to reduce the quantity of PFAS contaminants in the environment.
- The City of Fairbanks should be informed of data indicating the apparent migration of contamination associated with the City Source Area onto FAI property.

6.0 CLOSURE

This PFAS Groundwater Characterization report has been prepared for the exclusive use of DOT&PF FAI and their representatives in the study of this site. The investigation procedures and historical site information presented within this report are based on ADEC guidance current at the time of preparation, limited records review conducted by R&M, and information provided by the client. Since opinions of conditions prevailing on a particular site must be based on the work authorized by the client, the investigation is designed to be representative of the site at a particular moment in time and the result of services performed within the scope, limitations, and cost of the work requested. Changes in the conditions of this site may occur with the passage of time and may be due to natural processes or the works of humans. In addition, changes in government codes, either State or Federal regulations or laws, may occur. Due to such changes, which are beyond our control, observations and recommendations applicable to this site may need to be revised wholly or in part from time to time.

R&M performed this work in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No warranty, express or implied, beyond exercise of reasonable care and professional diligence, is made. Should you require additional information regarding the investigation or this report, please contact us.

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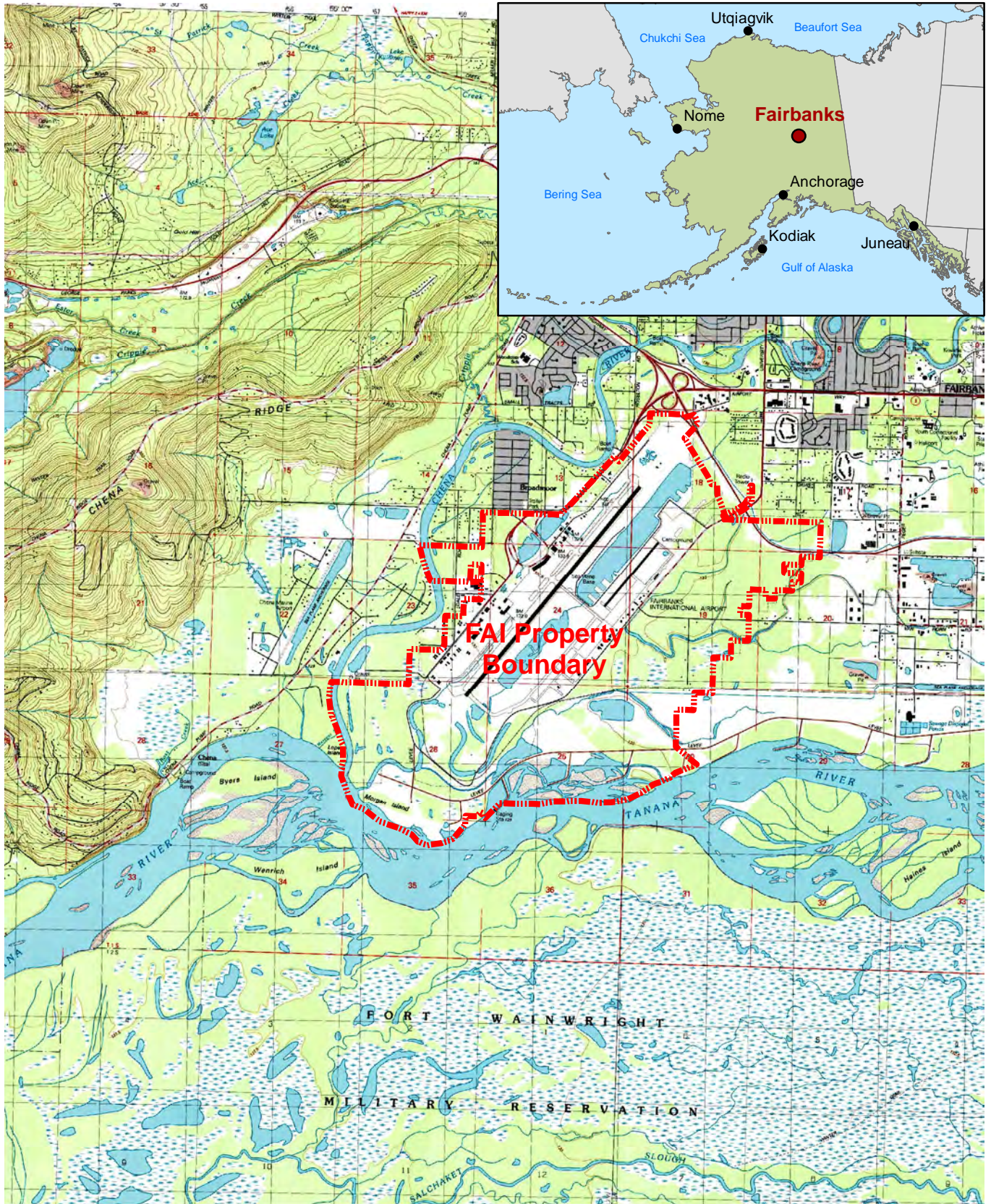
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APPENDIX A

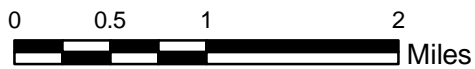
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ALL LOCATIONS ARE APPROXIMATE



APPROXIMATE SCALE IN MILES



DWN:	CDF
CKD:	KMM
DATE:	DEC 2018
SCALE:	AS SHOWN

PREPARED BY: R&M CONSULTANTS, INC.

FAIRBANKS INTERNATIONAL AIRPORT
2018 PFAS GW CHARACTERIZATION

LOCATION AND VICINITY MAP

FB:	N/A
GRID:	FAIRBANKS D-2
PROJ.NO:	2393.03
DWG:	A-01

Legend

 FAI Property Boundary



ALL LOCATIONS ARE APPROXIMATE
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 APPROXIMATE SCALE IN FEET

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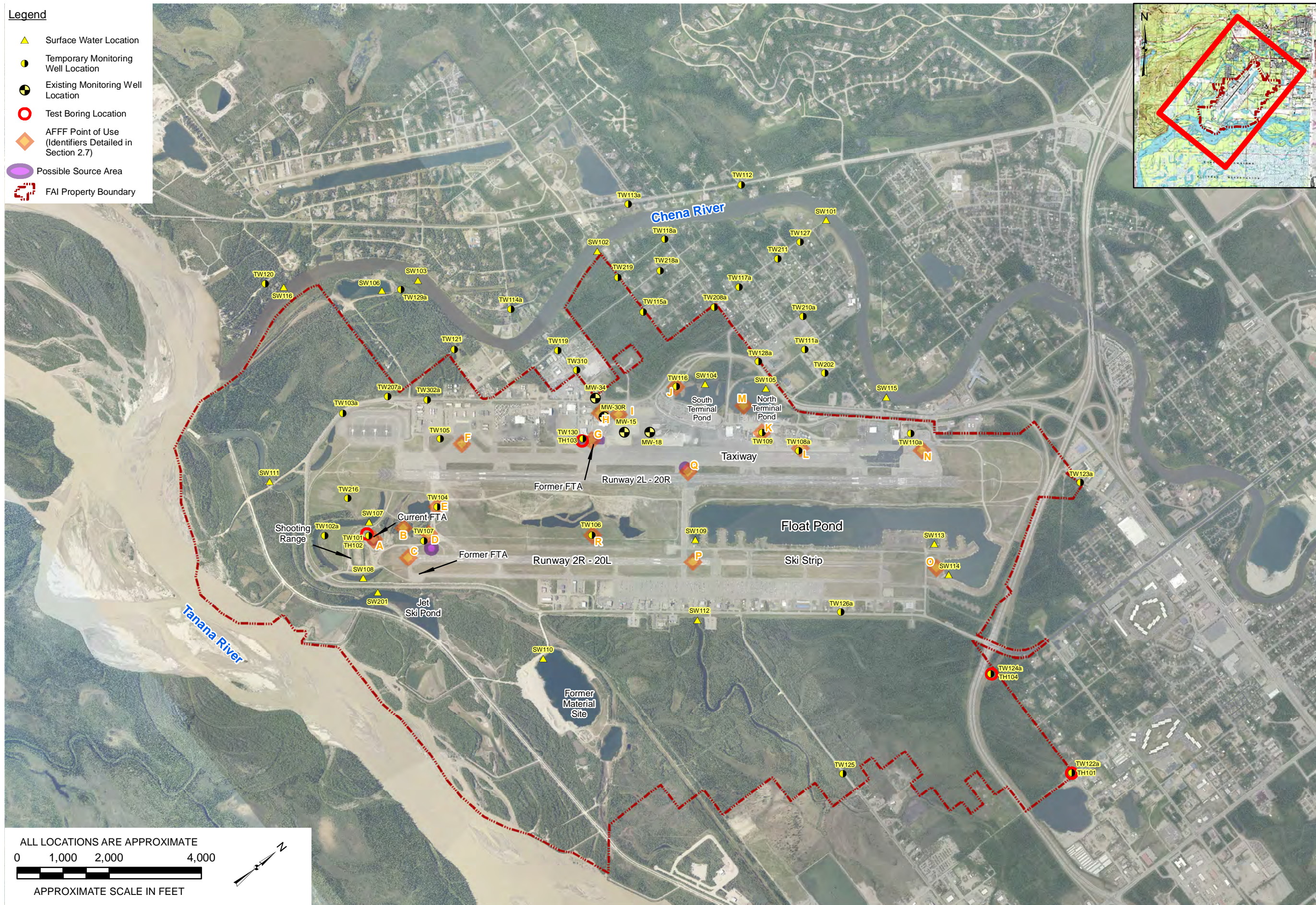
FAIRBANKS INTERNATIONAL AIRPORT 2018 PFAS GW CHARACTERIZATION	SITE FEATURES
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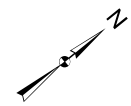
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DATE:	DEC 2018
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Legend

- ▲ Surface Water Location
- Temporary Monitoring Well Location
- Existing Monitoring Well Location
- Test Boring Location
- ◆ AFFF Point of Use (Identifiers Detailed in Section 2.7)
- Possible Source Area
- FAI Property Boundary



ALL LOCATIONS ARE APPROXIMATE
 0 1,000 2,000 4,000
 APPROXIMATE SCALE IN FEET



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PROJ.NO:	2393.03
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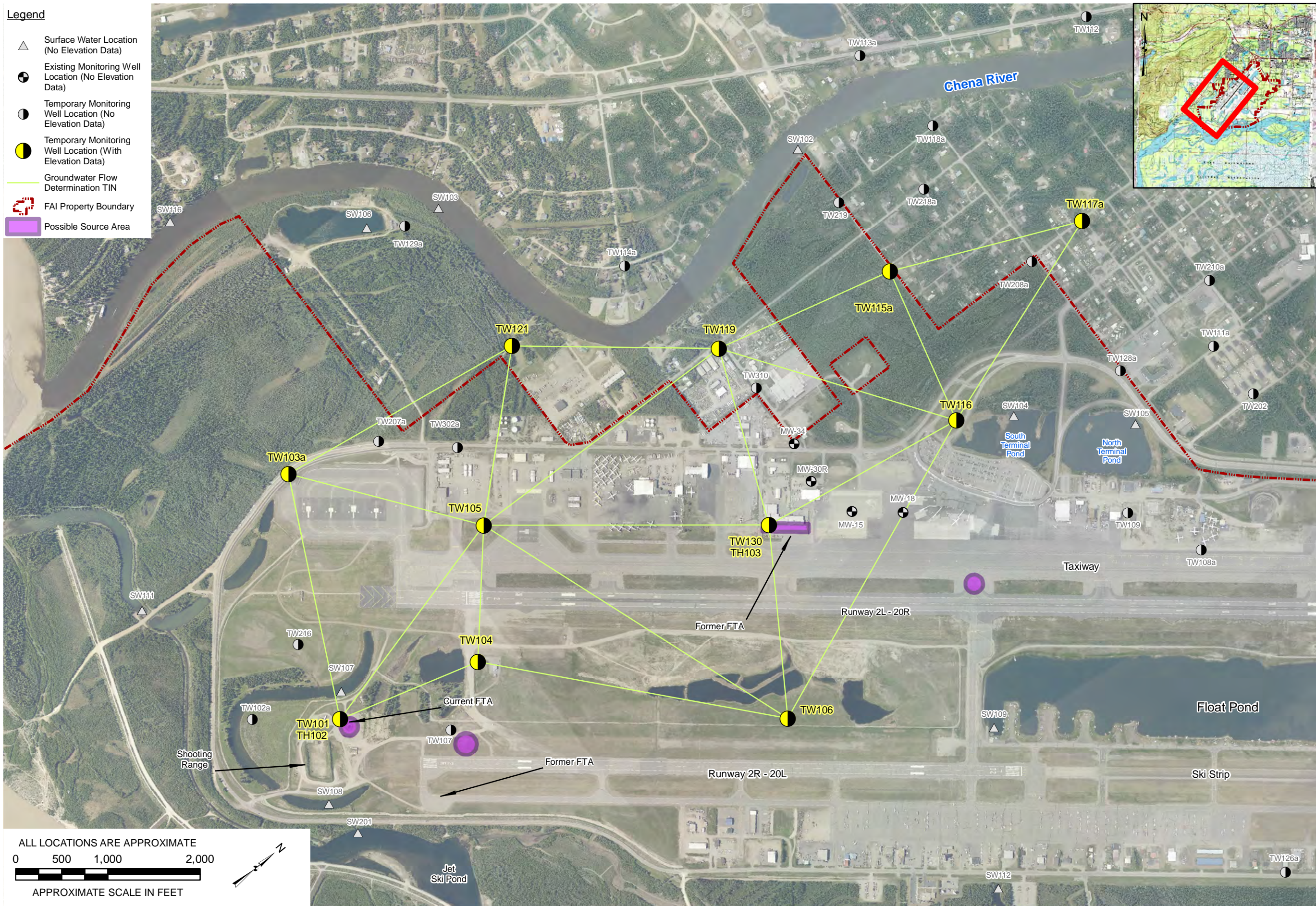
FAIRBANKS INTERNATIONAL AIRPORT 2018 PFAS GW CHARACTERIZATION	2018 INVESTIGATION LOCATIONS
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PREPARED BY: R&M CONSULTANTS, INC.

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CKD:	KMM
DATE:	DEC 2018
SCALE:	AS SHOWN

Legend

- △ Surface Water Location (No Elevation Data)
- Existing Monitoring Well Location (No Elevation Data)
- Temporary Monitoring Well Location (No Elevation Data)
- Temporary Monitoring Well Location (With Elevation Data)
- Groundwater Flow Determination TIN
- ▭ FAI Property Boundary
- ▭ Possible Source Area



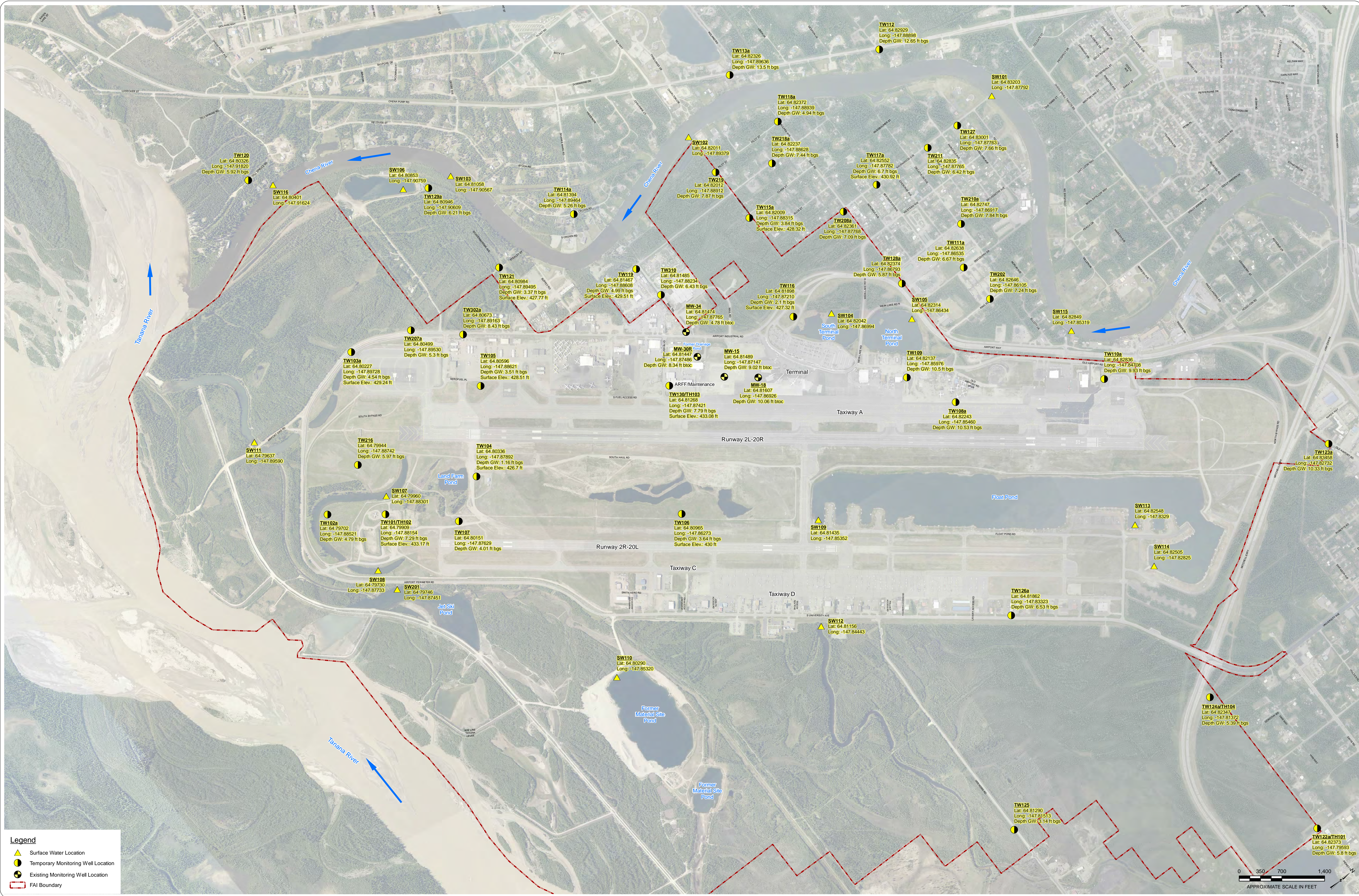
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PROJ.NO:	2393.03
DWG.:	A-04

FAIRBANKS INTERNATIONAL AIRPORT 2018 PFAS GW CHARACTERIZATION
2018 GROUNDWATER FLOW DIRECTION TIN MAP

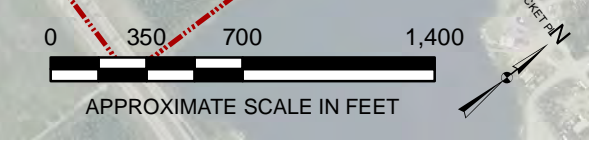
PREPARED BY: R&M CONSULTANTS, INC.

DWN:	CDF
CKD:	KMM
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Legend

- ▲ Surface Water Location
- Temporary Monitoring Well Location
- Existing Monitoring Well Location
- FAI Boundary



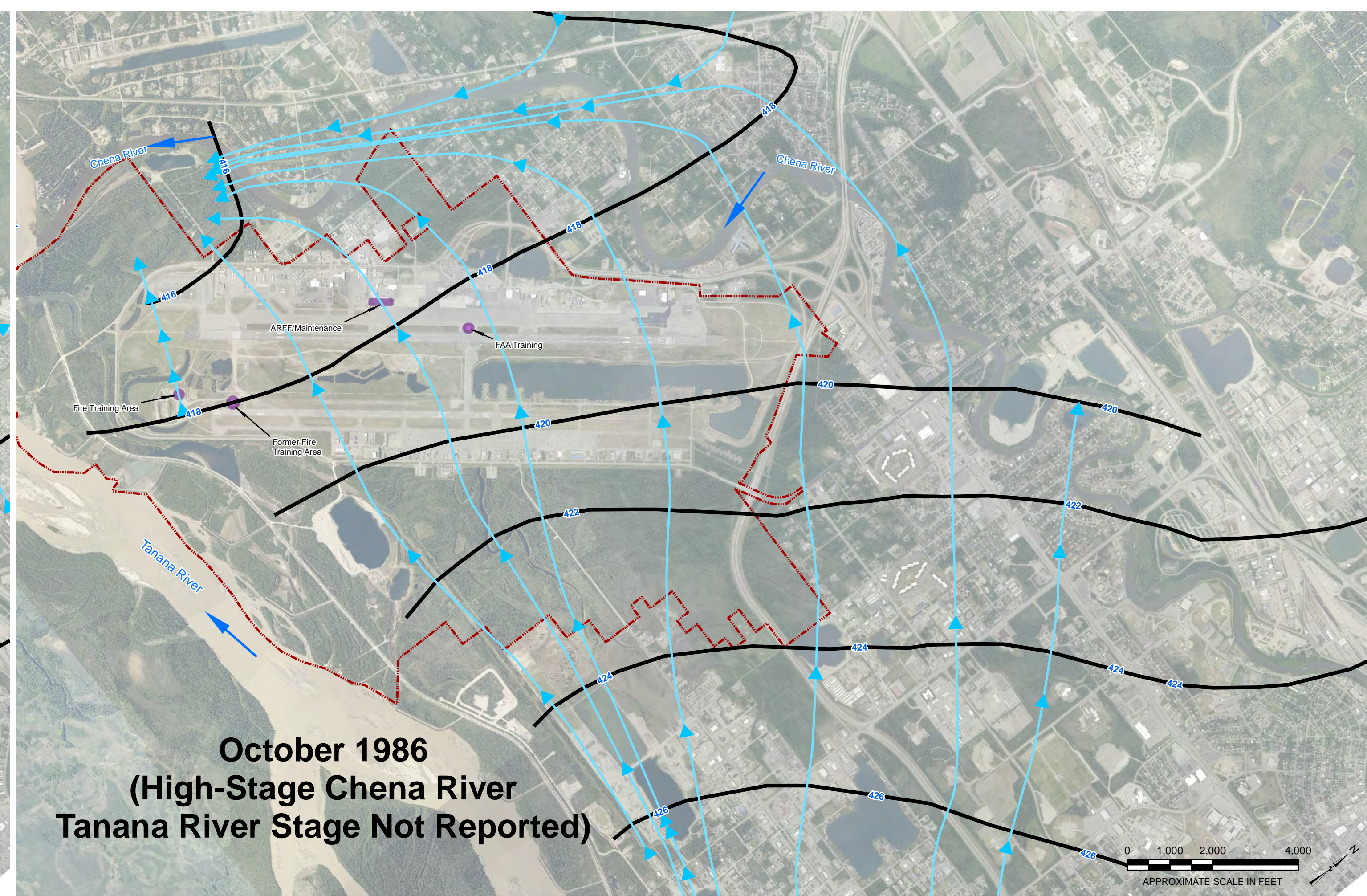
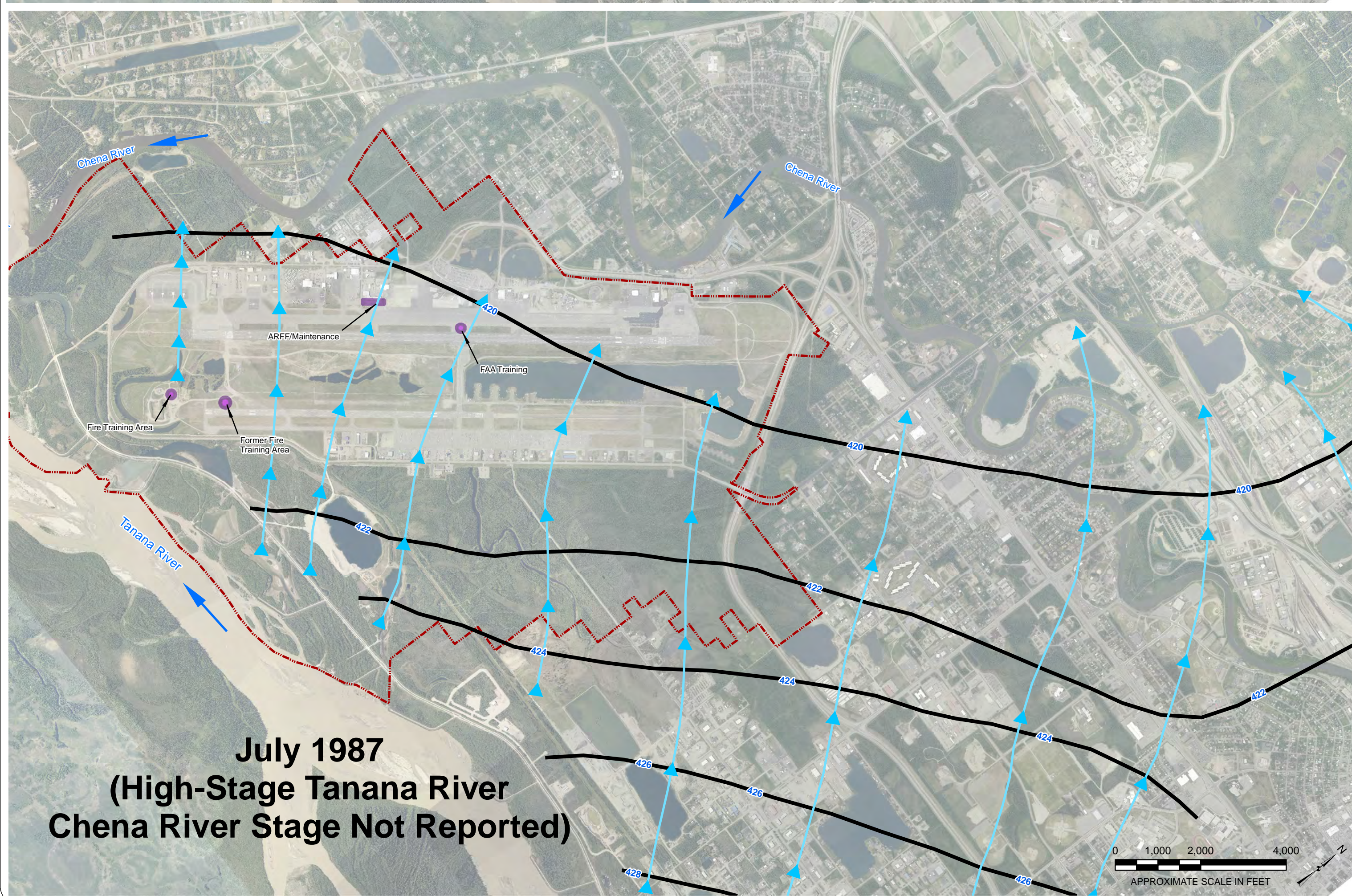
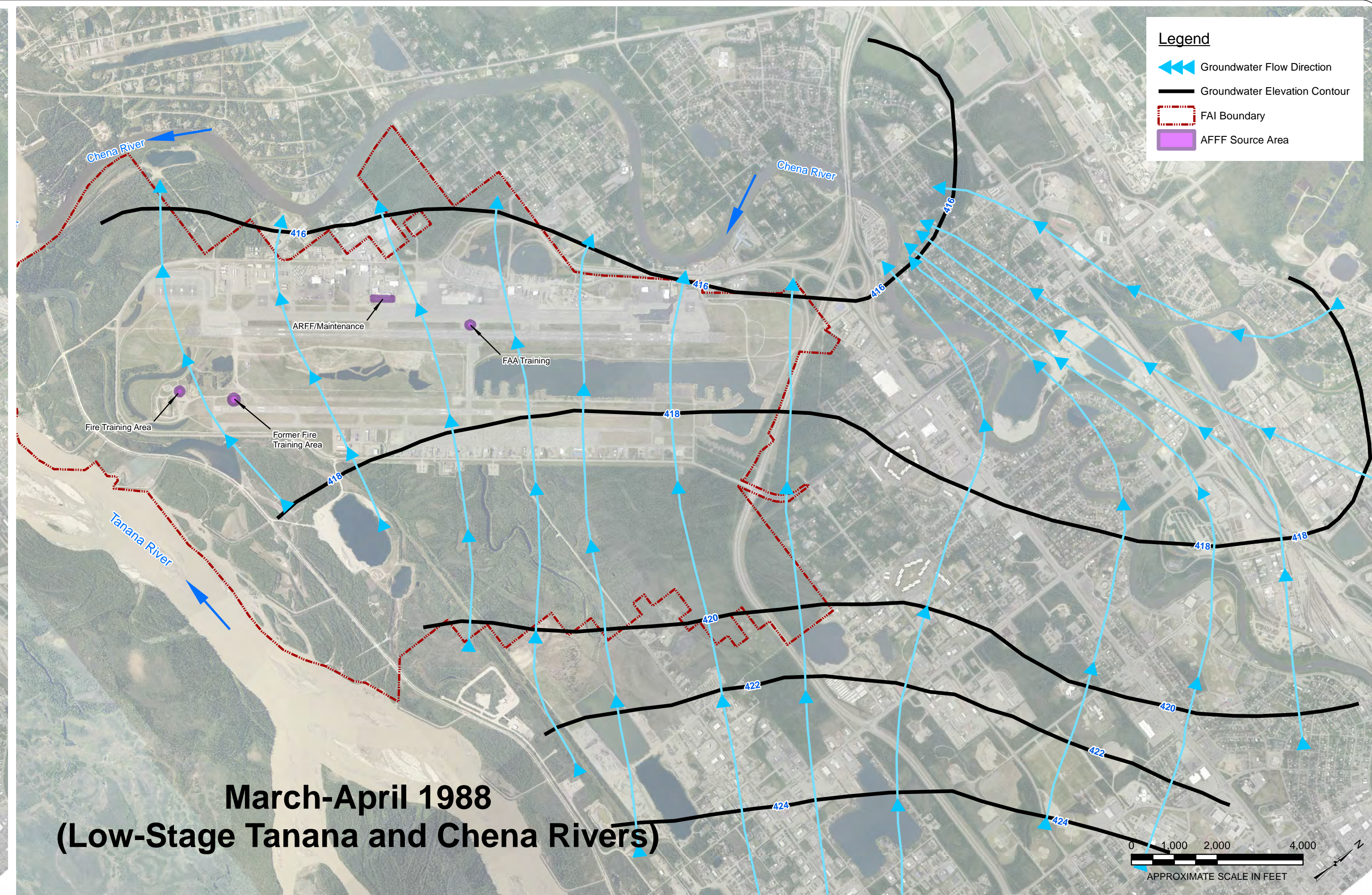
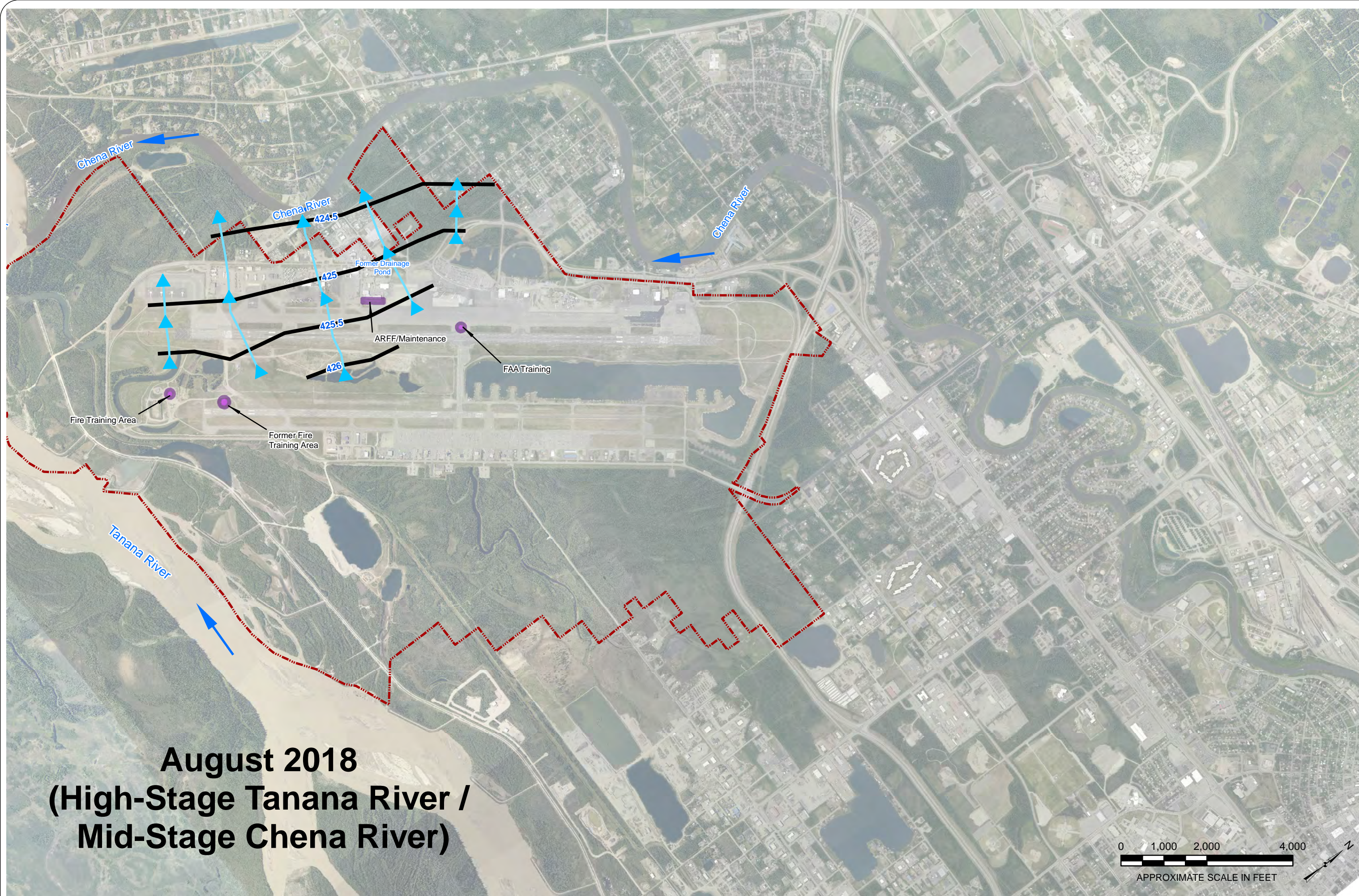
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GRID:	FAIRBANKS D-2		
PROJ. NO.:	2393.03	2018 ELEVATION SURVEY AND HORIZONTAL POSITIONS	
DWG.:	A-05		

Notes:

- Abbreviations: bgs = below groundwater level; bsw = below surface water level; bwc = below top of casing; npl/L = nanograms per liter; ft = feet
- Groundwater flow lines were prepared for the period of August 13 to August 16, 2016, and an elevation survey was conducted in October 2018.
- Groundwater flow lines were prepared for the period of August 13 to August 16, 2016, and an elevation survey was conducted in October 2018.
- Chemical PFAS results are reported in nanograms per liter (ng/L). Data flags (e.g., J, U) are defined in Appendix E. U flags represent non-detect results.
- Complete chemical data and quality review are provided in Appendices E, D, and F. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

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CKD:	KMM	SCALE:	AS SHOWN

PREPARED BY: FAI CONSULTANTS, INC.



Legend

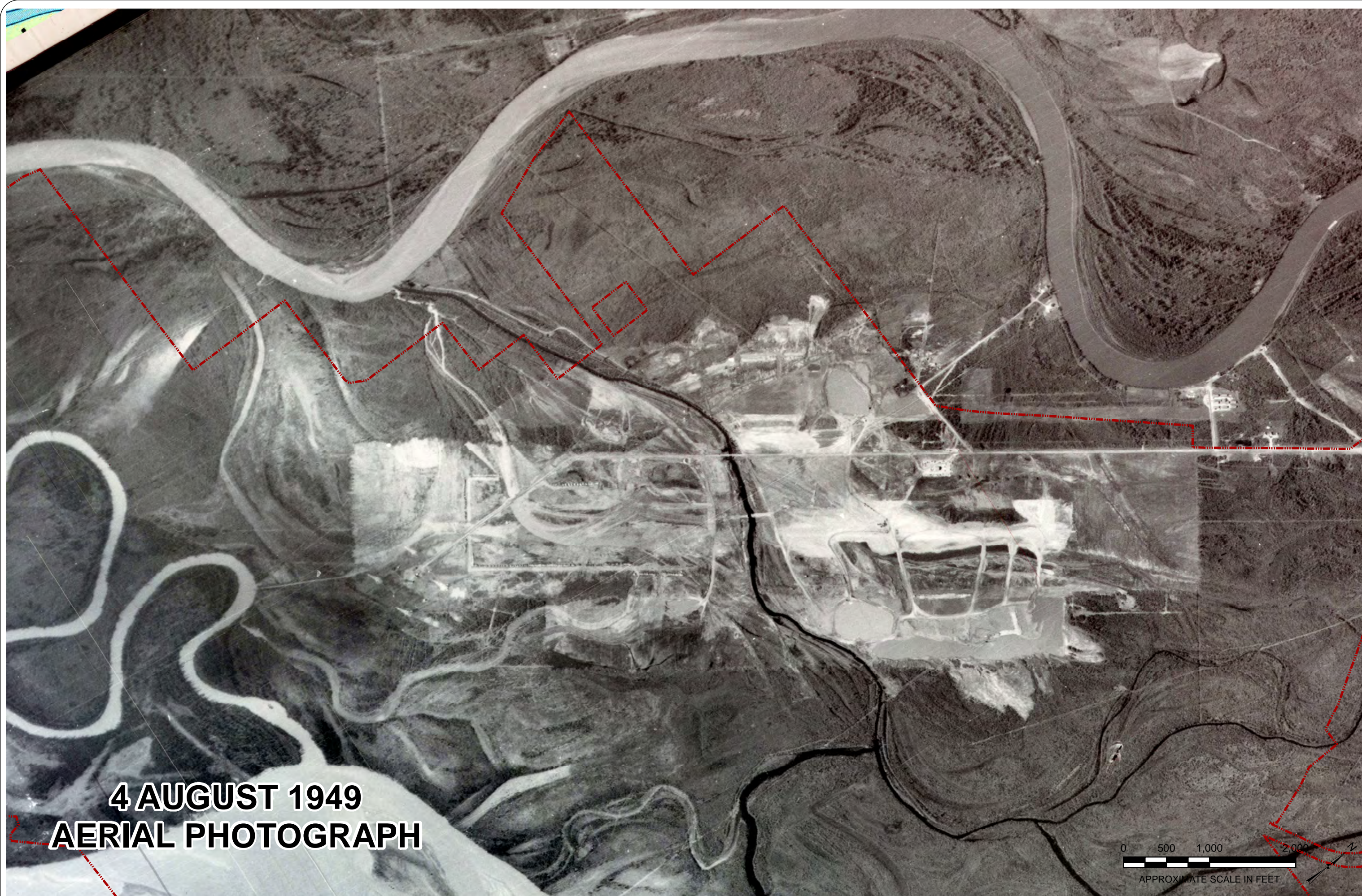
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- Groundwater Elevation Contour
- FAI Boundary
- AFF Source Area

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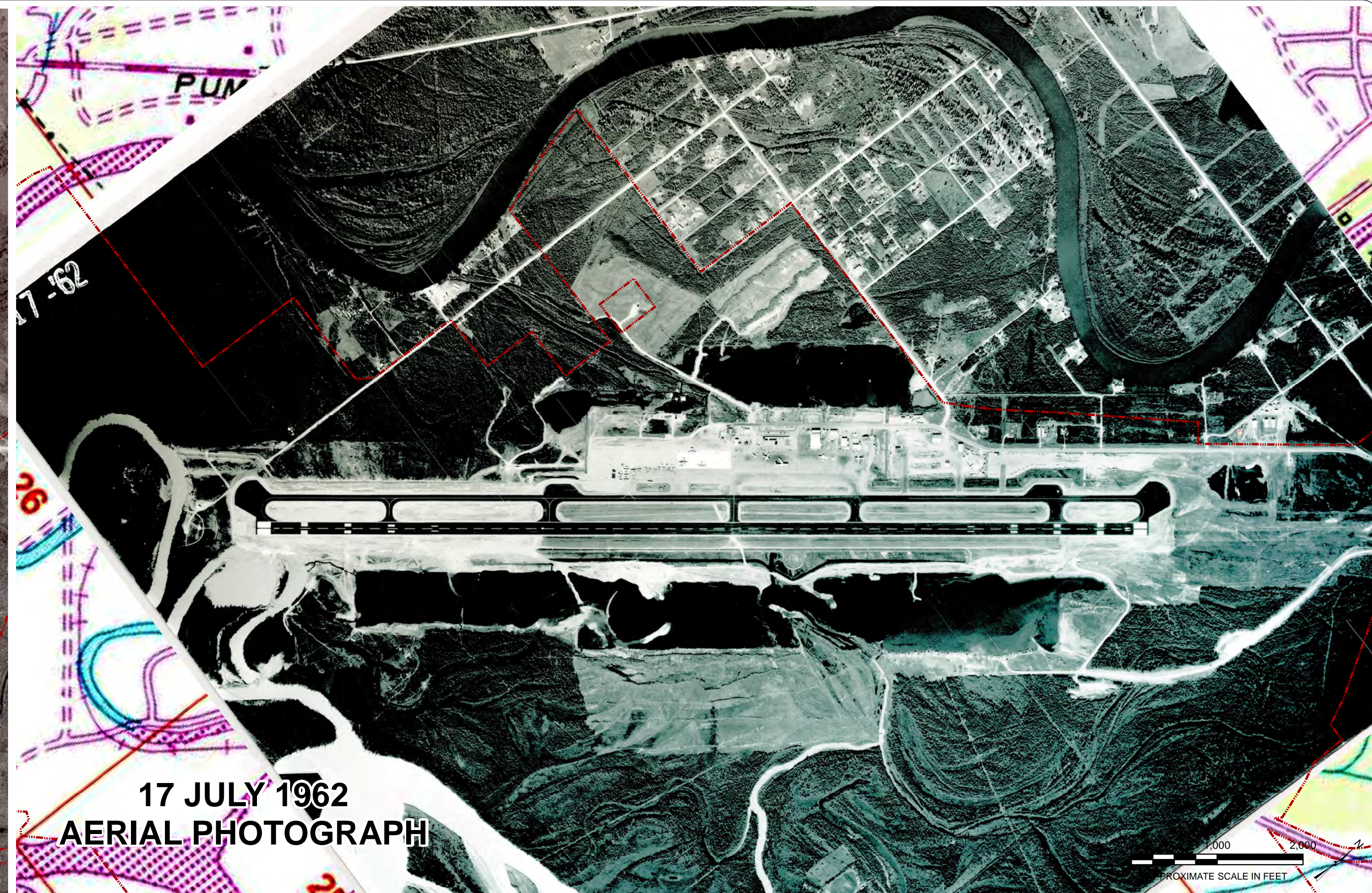
FAIRBANKS INTERNATIONAL AIRPORT
2018 PFAS GW CHARACTERIZATION
CURRENT AND HISTORICAL
GROUNDWATER MAPPING

Notes:
1. Groundwater contours from 1986, 1987, and 1988 were digitized from the 1996 USGS Water Resources Investigation Report 96-4060 and are in the NAVD88 datum.
2. 2018 groundwater contours were based on data collected from 13 to 18 August 2018 and an elevation survey conducted in October 2018 and are in the NAVD88 datum.
3. Groundwater flow lines were interpreted for each time frame.
4. River stage information for 1986, 1987, and 1988 are based on the 1996 USGS Water Resources Investigation Report 96-4060. River stage for 2018 is based on USGS river gauge records accessed via the USGS National Water Information System on 16 November 2018.

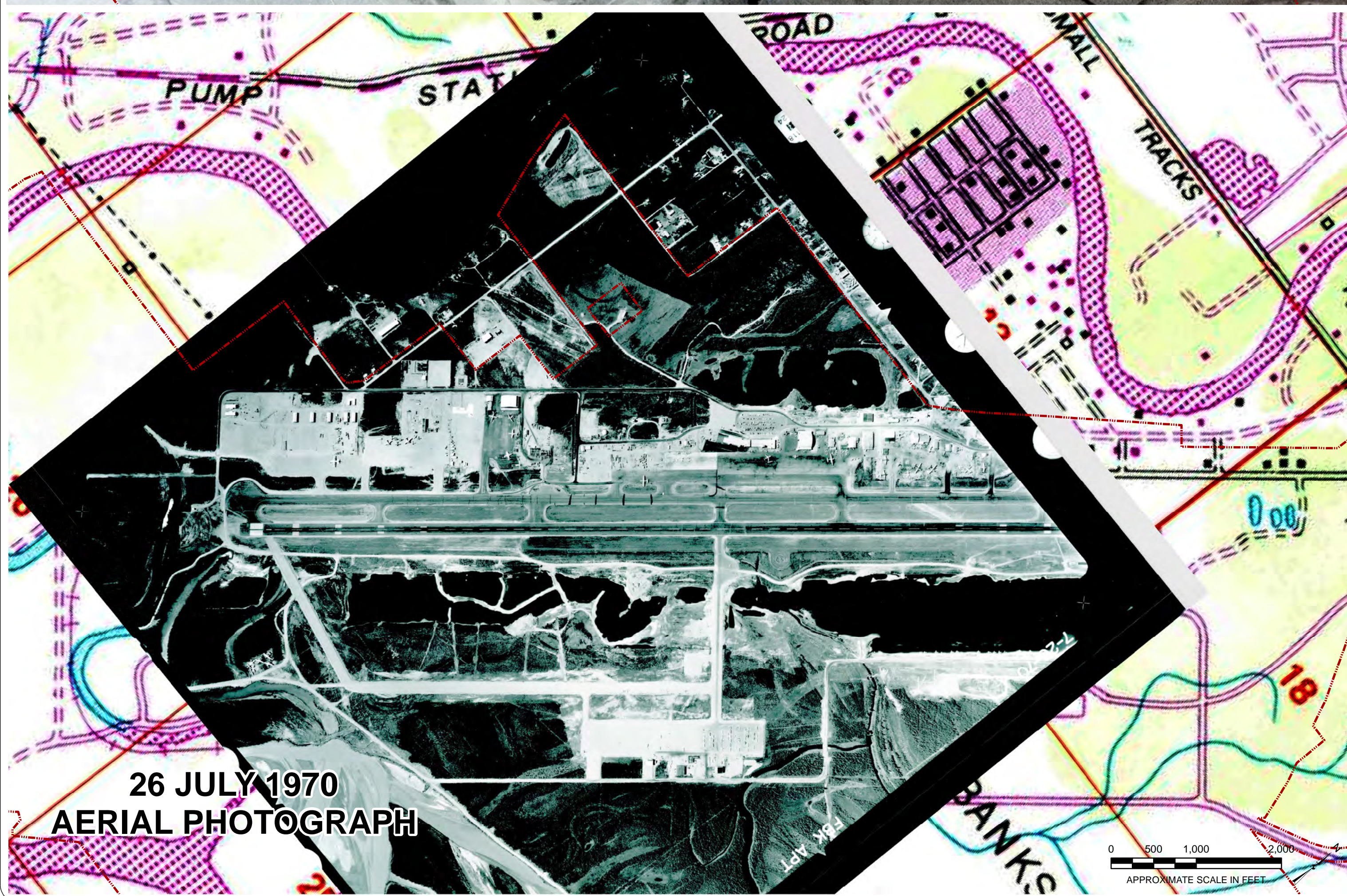
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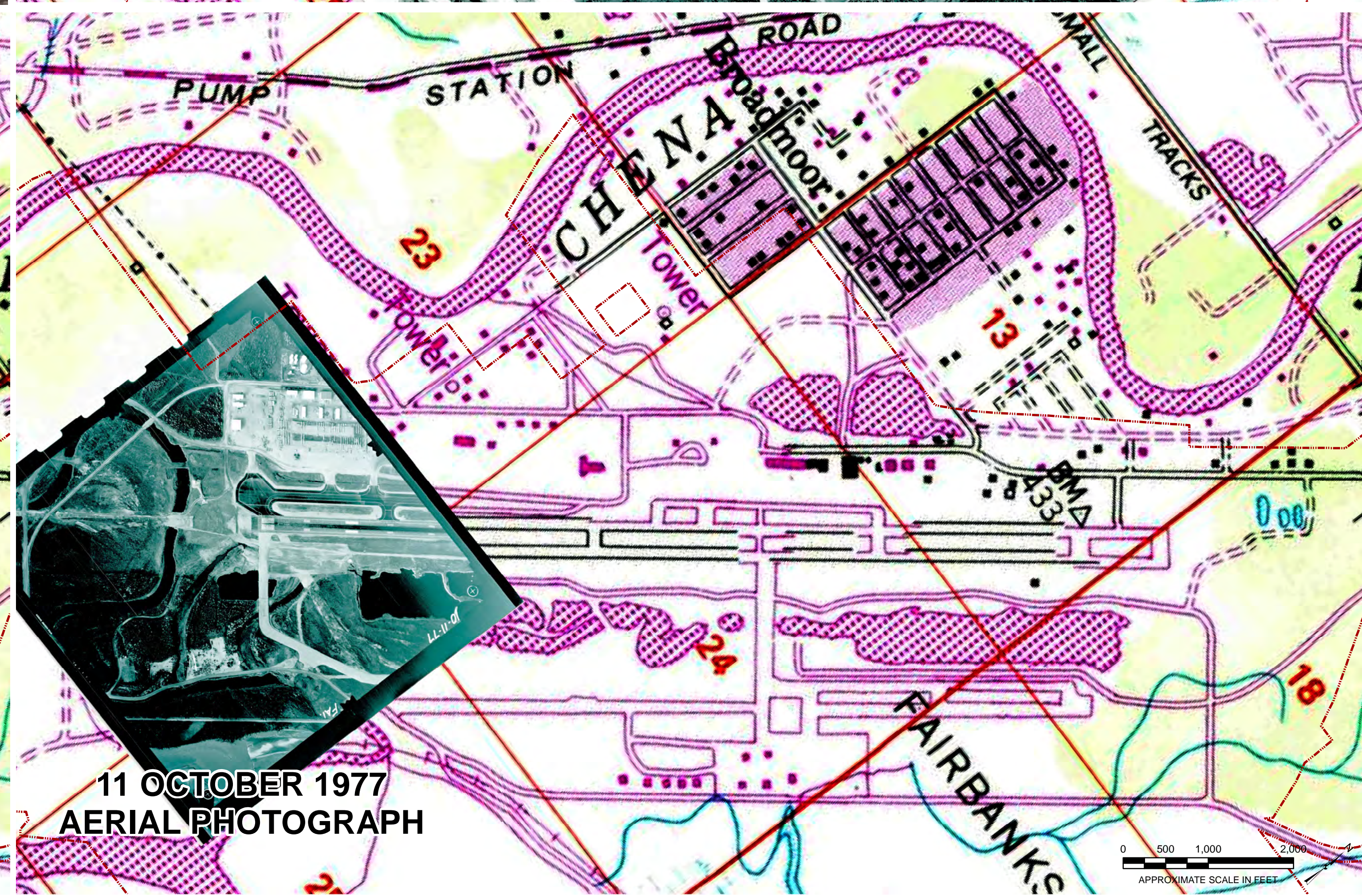
4 AUGUST 1949
AERIAL PHOTOGRAPH



17 JULY 1962
AERIAL PHOTOGRAPH



26 JULY 1970
AERIAL PHOTOGRAPH



11 OCTOBER 1977
AERIAL PHOTOGRAPH

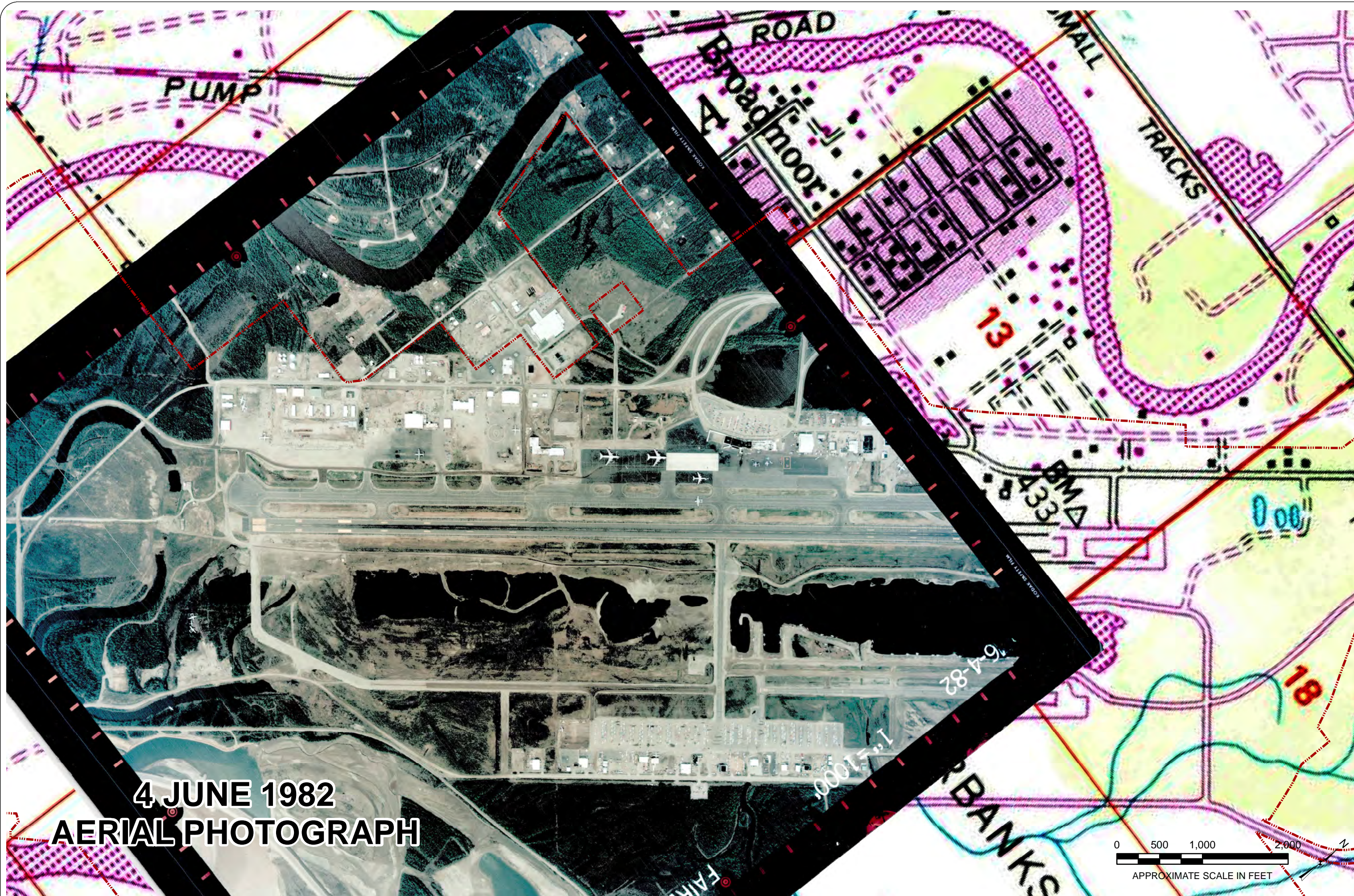
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DWG.:	A-07

FAIRBANKS INTERNATIONAL AIRPORT 2018 PFAS GW CHARACTERIZATION HISTORICAL AERIAL PHOTOGRAPHY 1949 TO 1977

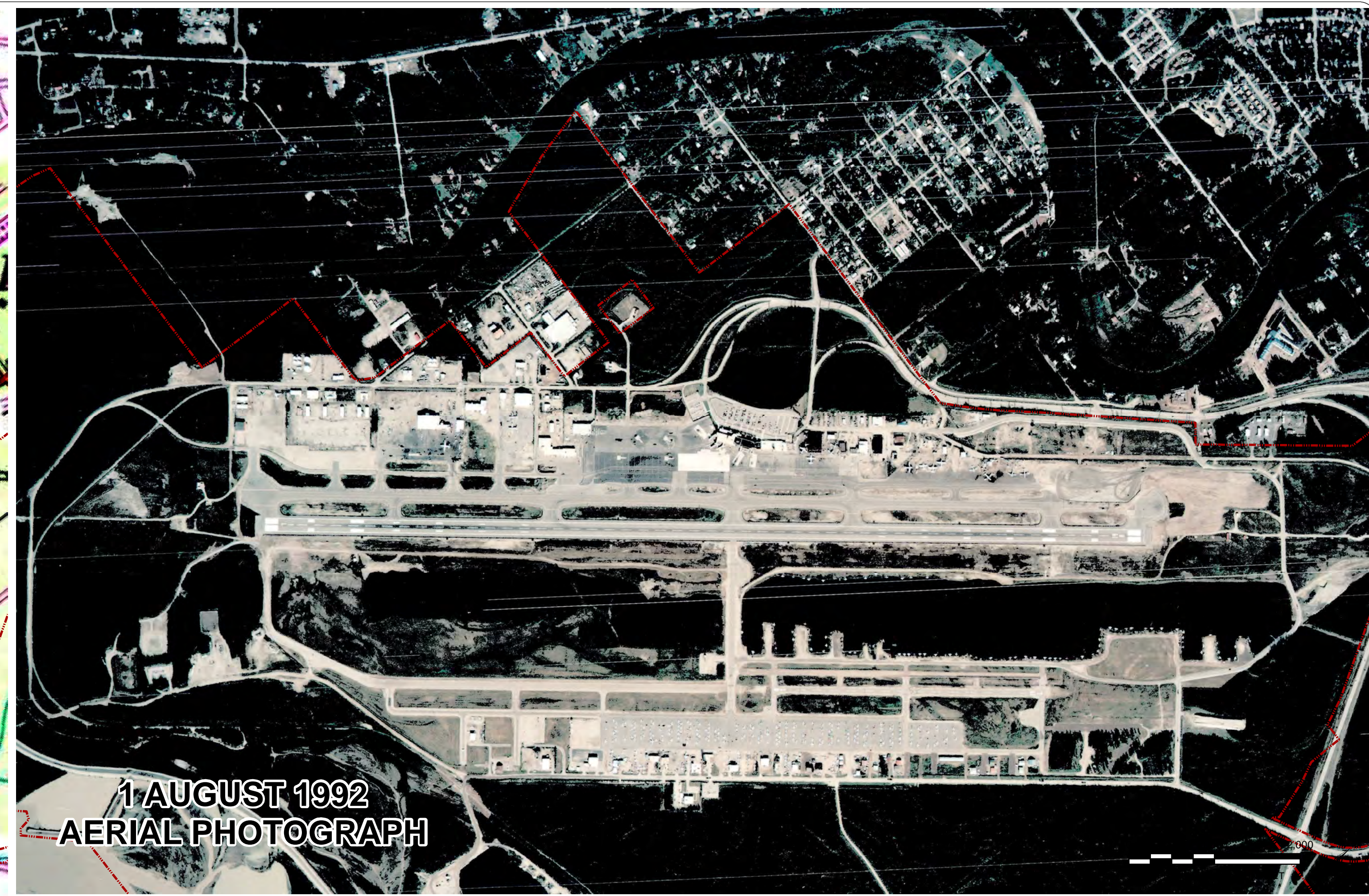
Notes:

1. Historical aerial photographs provided from Fairbanks International Airport internal files.
2. Aerial photographs were scanned by R&M Consultants, Inc. and georeferenced using the orthorectified 2012 Pictometry aerial photograph and the 1992 USGS topographic map.
3. Where historical aerial photographs do not cover the entire map area shown the 1954 USGS topographic map is added to the background.

DWN:	CFD
CKD:	KWM
DATE:	DEC 2018
SCALE:	AS SHOWN



4 JUNE 1982
AERIAL PHOTOGRAPH



1 AUGUST 1992
AERIAL PHOTOGRAPH



7 MAY 1997
AERIAL PHOTOGRAPH



SUMMER 2012
AERIAL PHOTOGRAPH

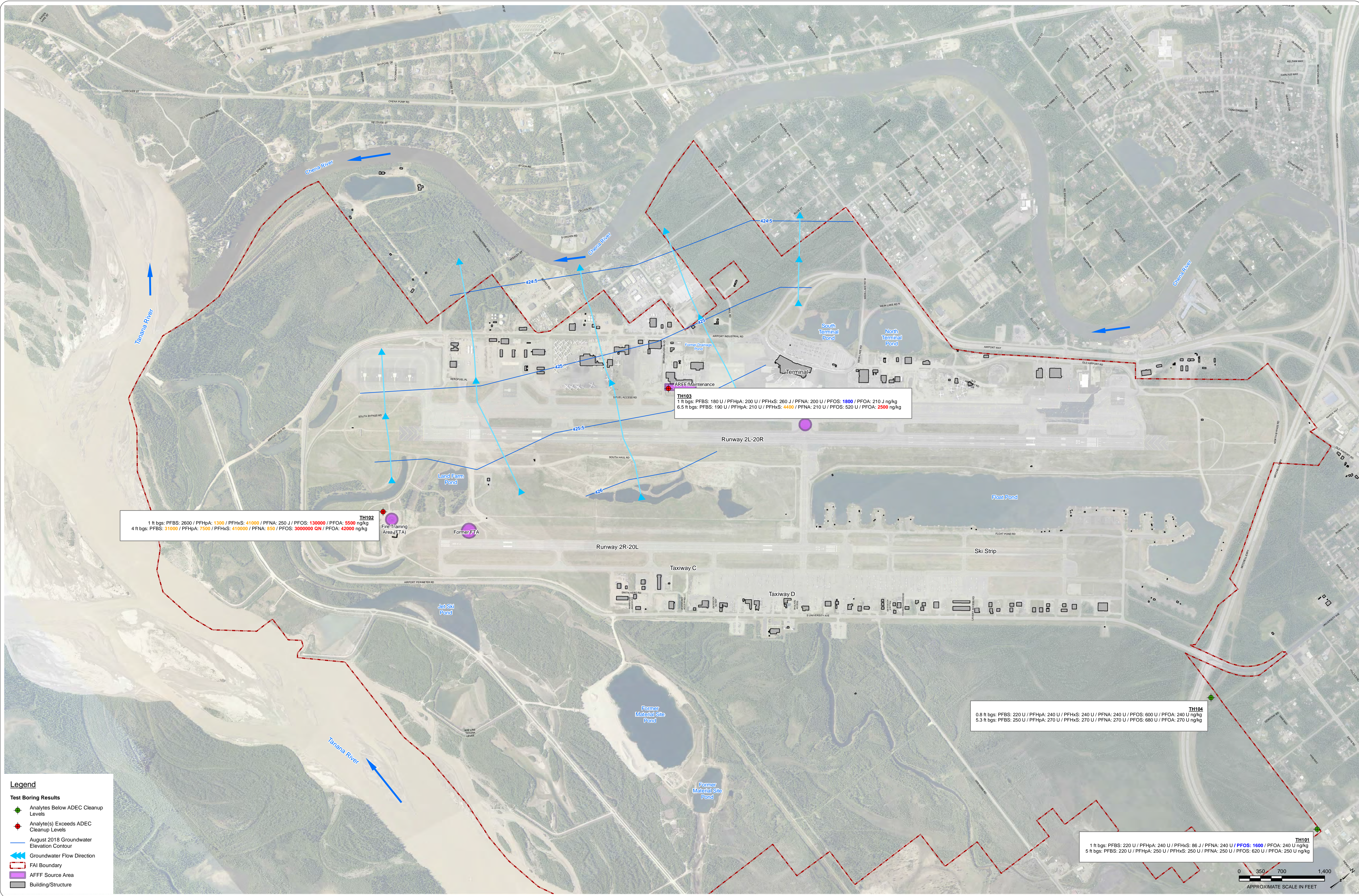
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GRID:	FAIRBANKS D-2
PROJ. NO.:	2393.03
DWG.:	A-08

FAIRBANKS INTERNATIONAL AIRPORT 2018 PFAS GW CHARACTERIZATION HISTORICAL AERIAL PHOTOGRAPHY 1982 TO 2012

Notes:

1. Historical aerial photographs provided from Fairbanks International Airport internal files.
2. Aerial photographs were scanned by R&M Consultants, Inc. and georeferenced using the orthorectified 2012 Pictometry aerial photograph and the 1992 USGS topographic map.
3. Where historical aerial photographs do not cover the entire map area shown the 1954 USGS topographic map is added to the background.

DWN:	CDF
CKD:	KWM
DATE:	DEC 2018
SCALE:	AS SHOWN



TH102
 1 ft bgs: PFBS: 2600 / PFHpA: 1300 / PFHxS: 41000 / PFNA: 250 J / PFOS: 130000 / PFOA: 5500 ng/kg
 4 ft bgs: PFBS: 31000 / PFHpA: 7500 / PFHxS: 410000 / PFNA: 850 / PFOS: 3000000 QN / PFOA: 42000 ng/kg

TH103
 1 ft bgs: PFBS: 180 U / PFHpA: 200 U / PFHxS: 260 J / PFNA: 200 U / PFOS: 1800 / PFOA: 210 J ng/kg
 6.5 ft bgs: PFBS: 190 U / PFHpA: 210 U / PFHxS: 4400 / PFNA: 210 U / PFOS: 520 U / PFOA: 2500 ng/kg

TH104
 0.8 ft bgs: PFBS: 220 U / PFHpA: 240 U / PFHxS: 240 U / PFNA: 240 U / PFOS: 600 U / PFOA: 240 U ng/kg
 5.3 ft bgs: PFBS: 250 U / PFHpA: 270 U / PFHxS: 270 U / PFNA: 270 U / PFOS: 680 U / PFOA: 270 U ng/kg

TH101
 1 ft bgs: PFBS: 220 U / PFHpA: 240 U / PFHxS: 86 J / PFNA: 240 U / PFOS: 1600 / PFOA: 240 U ng/kg
 5 ft bgs: PFBS: 220 U / PFHpA: 250 U / PFHxS: 250 U / PFNA: 250 U / PFOS: 620 U / PFOA: 250 U ng/kg

- Legend**
- Test Boring Results
 - ◆ Analytes Below ADEC Cleanup Levels
 - ◆ Analyte(s) Exceeds ADEC Cleanup Levels
 - August 2018 Groundwater Elevation Contour
 - ⇄ Groundwater Flow Direction
 - ▭ FAI Boundary
 - ▭ AFFF Source Area
 - ▭ Building/Structure

0 350 700 1,400
 APPROXIMATE SCALE IN FEET

FB:	N/A	FAIRBANKS INTERNATIONAL AIRPORT
GRID:	FAIRBANKS D-2	2018 PFAS GW CHARACTERIZATION
PROJ.NO.:	2393.03	SUMMARIZED SOIL ANALYTICAL RESULTS
DWG.:	A-09	

DWN:	CDF
CKD:	KMM
DATE:	DEC 2018
SCALE:	AS SHOWN

Notes:

- Results exceeding a cleanup level are highlighted red and are BOLD.
- Results exceeding 10 times the associated groundwater action level are highlighted orange and BOLD where no cleanup level is available.
- Chemical results are reported in nanograms per kilogram (ng/kg). Data flags (e.g., J, U) are defined in Appendix E. U flags represent non-detect results.
- Abbreviations: bgs = below ground surface; ng/kg = nanograms per kilogram.
- Where primary and duplicate chemical results are available, the higher result is reported by this drawing.



Legend

- August 2018 Groundwater Elevation Contour
- Groundwater Flow Direction
- FAI Boundary
- AFFF Source Area
- Building/Structure

Surface Water Sample Location Results

- Below 1,000 ng/L
- Elevated 1,000 to 1,999 ng/L
- Exceeds 1,999 ng/L

Temporary/Existing Monitoring Well Results

- Below 1,000 ng/L
- Elevated 1,000 to 1,999 ng/L
- Exceeds 1,999 ng/L

FB: N/A
 GRID: FAIRBANKS D-2
 PROJNO: 2393.03
 DWG.: A-10

FAIRBANKS INTERNATIONAL AIRPORT
 2018 PFAS GW CHARACTERIZATION
 PFES SUMMARIZED GROUNDWATER /
 SURFACE WATER ANALYTICAL RESULTS

Notes:
 1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018.
 2. Groundwater contours are labeled with the elevation in feet in the NAVD 83 elevation datum.
 3. Chemical results are reported in nanograms per liter (ng/L). Data tags (e.g., J, U) are defined in Appendix E. U flags represent non-detect results.
 4. Abbreviations: bgw = below groundwater level; bsw = below surface water; ng/L = nanograms per liter.
 5. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

DWN: CDF
 CKD: KMM
 DATE: JAN 2019
 SCALE: AS SHOWN



Legend

- August 2018 Groundwater Elevation Contour
- Groundwater Flow Direction
- FAI Boundary
- AFFF Source Area
- Building/Structure

Surface Water Sample Location Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

Temporary/Existing Monitoring Well Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

FB: N/A
 GRID: FAIRBANKS D-2
 PROJNO: 2393.03
 DWG.: A-11

FAIRBANKS INTERNATIONAL AIRPORT
 2018 PFAS GW CHARACTERIZATION
 PFHA SUMMARIZED GROUNDWATER / SURFACE WATER ANALYTICAL RESULTS

Notes:
 1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018.
 2. Groundwater contours are labeled with the elevation in feet in the NAVD 83 elevation datum.
 3. Chemical results are reported in nanograms per liter (ng/L). Data flags (e.g., J, U) are defined in Appendix E. U flags represent non-detect results.
 4. Abbreviations: bsw = below groundwater level, bsw = below surface water, ng/L = nanograms per liter.
 5. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

DWN: CDF
 CKD: KMM
 DATE: JAN 2019
 SCALE: AS SHOWN



Legend

- August 2018 Groundwater Elevation Contour
- Groundwater Flow Direction
- FAI Boundary
- AFFF Source Area
- Building/Structure

Surface Water Sample Location Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

Temporary/Existing Monitoring Well Results

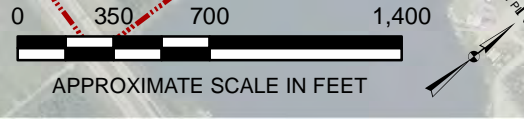
- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

FB: N/A
 GRID: FAIRBANKS D-2
 PROJNO: 2383.03
 DWG.: A-12

FAIRBANKS INTERNATIONAL AIRPORT
 2018 PFAS GW CHARACTERIZATION
 PFAS SUMMARIZED GROUNDWATER /
 SURFACE WATER ANALYTICAL RESULTS

Notes:
 1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018.
 2. Groundwater contours are labeled with the elevation in feet in the NAVD 83 elevation datum.
 3. Chemical results are reported in nanograms per liter (ng/L). Data flags (e.g., J, U) are defined in Appendix E. U flags represent non-detect results.
 4. Abbreviations: bgw = below groundwater level, bsw = below surface water, ng/L = nanograms per liter.
 5. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

DWN: CDF
 CKD: KMM
 DATE: JAN 2019
 SCALE: AS SHOWN





Legend

- August 2018 Groundwater Elevation Contour
- Groundwater Flow Direction
- FAI Boundary
- AFFF Source Area
- Building/Structure

Surface Water Sample Location Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

Temporary/Existing Monitoring Well Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

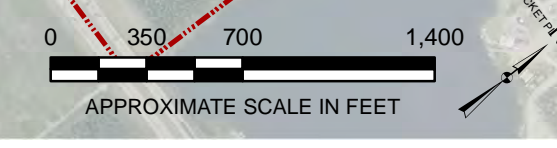
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 GRID: FAIRBANKS D-2
 PROJNO: 2393.03
 DWG.: A-13

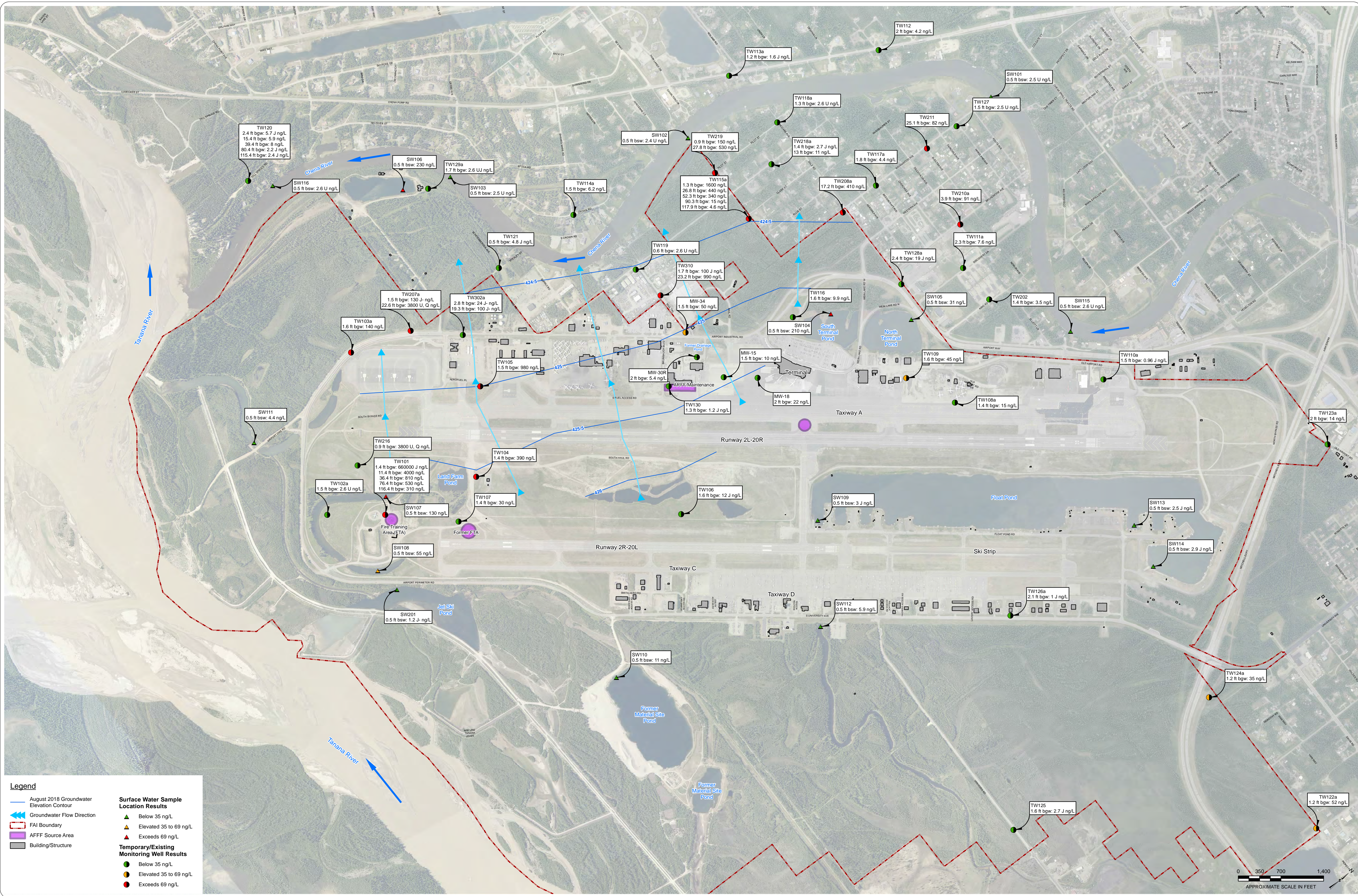
FAIRBANKS INTERNATIONAL AIRPORT
 2018 PFAS GW CHARACTERIZATION
 PFNA SUMMARIZED GROUNDWATER /
 SURFACE WATER ANALYTICAL RESULTS

Notes:
 1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018.
 2. Groundwater contours are labeled with the elevation in feet in the NAVD 83 elevation datum.
 3. Chemical results are reported in nanograms per liter (ng/L). Data tags (e.g., U) are defined in Appendix E. U flags represent non-detect results.
 4. Abbreviations: bgw = below groundwater level, bsw = below surface water, ng/L = nanograms per liter.
 5. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

DWN: CDF
 CKD: KMM
 DATE: JAN 2019
 SCALE: AS SHOWN

Date Saved: 1/24/2019 9:41:59 AM by CFEll
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Legend

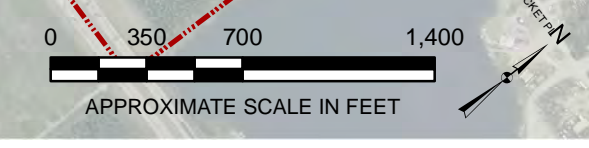
- August 2018 Groundwater Elevation Contour
- Groundwater Flow Direction
- FAI Boundary
- AFFF Source Area
- Building/Structure

Surface Water Sample Location Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

Temporary/Existing Monitoring Well Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L



FB: N/A
 GRID: FAIRBANKS D-2
 PROJNO: 2393.03
 DWG.: A-14

FAIRBANKS INTERNATIONAL AIRPORT
 2018 PFAS GW CHARACTERIZATION
 PFOS SUMMARIZED GROUNDWATER/
 SURFACE WATER ANALYTICAL RESULTS

Notes:
 1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018.
 2. Groundwater contours are labeled with the elevation in feet in the NAVD 83 elevation datum.
 3. Chemical results are reported in nanograms per liter (ng/L). Data flags (e.g., J, U) are defined in Appendix E. U flags represent non-detect results.
 4. Abbreviations: bsw = below groundwater level; bsw = below surface water; ng/L = nanograms per liter.
 5. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

DWN: CDF
 CKD: KMM
 DATE: JAN 2019
 SCALE: AS SHOWN



Legend

- August 2018 Groundwater Elevation Contour
- Groundwater Flow Direction
- FAI Boundary
- AFFF Source Area
- Building/Structure

Surface Water Sample Location Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

Temporary/Existing Monitoring Well Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

FB: N/A
 GRID: FAIRBANKS D-2
 PROJNO: 2393.03
 DWG: A-15

FAIRBANKS INTERNATIONAL AIRPORT
 2018 PFAS GW CHARACTERIZATION
 PFOA SUMMARIZED GROUNDWATER /
 SURFACE WATER ANALYTICAL RESULTS

Notes:
 1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018.
 2. Groundwater contours are labeled with the elevation in feet in the NAVD 83 elevation datum.
 3. Chemical results are reported in nanograms per liter (ng/L). Data tags (e.g., J, U) are defined in Appendix E. U flags represent non-detect results.
 4. Abbreviations: bsw = below groundwater level, bsw = below surface water, ng/L = nanograms per liter.
 5. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

DWN: CDF
 CKD: KMM
 DATE: JAN 2019
 SCALE: AS SHOWN



Legend

- August 2018 Groundwater Elevation Contour
- Groundwater Flow Direction
- FAI Boundary
- AFFF Source Area
- Building/Structure

Surface Water Sample Location Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

Groundwater Sample Location Results

- Below 35 ng/L
- Elevated 35 to 69 ng/L
- Exceeds 69 ng/L

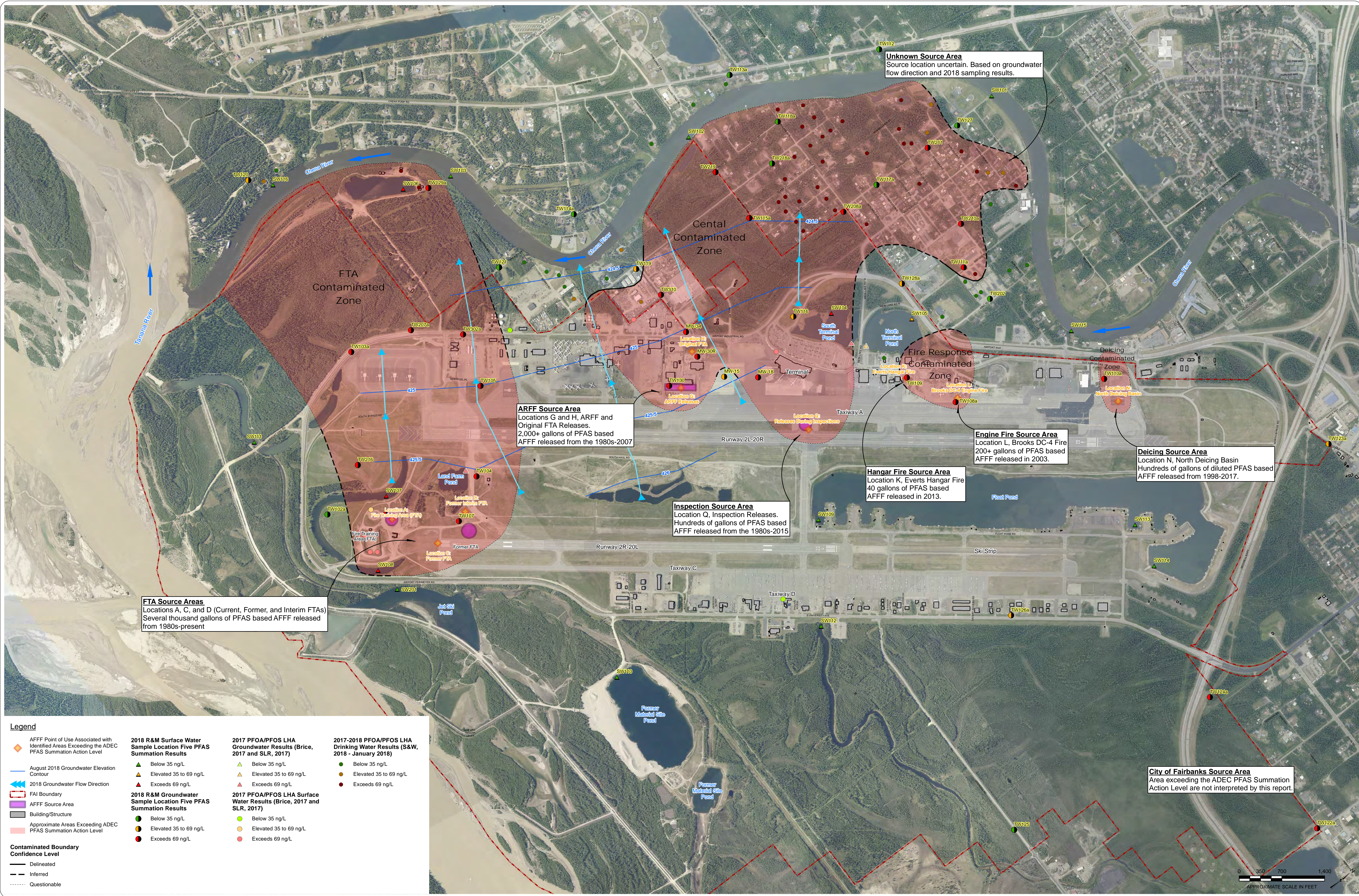
Notes:

1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018.
2. Groundwater contours are labeled with the elevation in feet in the NAVD 83 elevation datum.
3. Chemical PFAS results are reported in nanograms per liter (ng/L). Data flags (e.g. J, U) are defined in Appendix E. U flags represent non-detect results.
4. Abbreviations: bgw = below groundwater level; bsw = below surface water; ng/L = nanograms per liter.
5. Where primary and duplicate chemical results are available, the higher result is reported by this drawing.

FAIRBANKS INTERNATIONAL AIRPORT
2018 PFAS GW CHARACTERIZATION
FIVE PFAS SUMMATION GROUNDWATER / SURFACE WATER ANALYTICAL RESULTS

FB: N/A
GRID: FAIRBANKS D-2
PROJNO: 2383.03
DWG.: A-16

DWN: CDF
CKD: KMM
DATE: JAN 2019
SCALE: AS SHOWN



FTA Source Areas
Locations A, C, and D (Current, Former, and Interim FTAs)
Several thousand gallons of PFAS based AFFF released from 1980s-present

ARFF Source Area
Locations G and H, ARFF and Original FTA Releases.
2,000+ gallons of PFAS based AFFF released from the 1980s-2007

Inspection Source Area
Location Q, Inspection Releases.
Hundreds of gallons of PFAS based AFFF released from the 1980s-2015

Hangar Fire Source Area
Location K, Everts Hangar Fire
40 gallons of PFAS based AFFF released in 2013.

Engine Fire Source Area
Location L, Brooks DC-4 Fire
200+ gallons of PFAS based AFFF released in 2003.

Deicing Source Area
Location N, North Deicing Basin
Hundreds of gallons of diluted PFAS based AFFF released from 1998-2017.

Unknown Source Area
Source location uncertain. Based on groundwater flow direction and 2018 sampling results.

City of Fairbanks Source Area
Area exceeding the ADEC PFAS Summation Action Level are not interpreted by this report.

Legend

- Orange diamond: AFFF Point of Use Associated with Identified Areas Exceeding the ADEC PFAS Summation Action Level
- Blue line: August 2018 Groundwater Elevation Contour
- Blue arrow: 2018 Groundwater Flow Direction
- Red dashed line: FAI Boundary
- Purple outline: AFFF Source Area
- Grey outline: Building/Structure
- Red outline: Approximate Areas Exceeding ADEC PFAS Summation Action Level
- Black dashed line: Contaminated Boundary Confidence Level
- Black solid line: Delineated
- Black dotted line: Inferred
- Black dash-dot line: Questionable

<p>2018 R&M Surface Water Sample Location Five PFAS Summation Results</p> <ul style="list-style-type: none"> Green triangle: Below 35 ng/L Yellow triangle: Elevated 35 to 69 ng/L Red triangle: Exceeds 69 ng/L <p>2018 R&M Groundwater Sample Location Five PFAS Summation Results</p> <ul style="list-style-type: none"> Green circle: Below 35 ng/L Yellow circle: Elevated 35 to 69 ng/L Red circle: Exceeds 69 ng/L 	<p>2017 PFOA/PFOS LHA Groundwater Results (Brice, 2017 and SLR, 2017)</p> <ul style="list-style-type: none"> Green triangle: Below 35 ng/L Yellow triangle: Elevated 35 to 69 ng/L Red triangle: Exceeds 69 ng/L <p>2017 PFOA/PFOS LHA Surface Water Results (Brice, 2017 and SLR, 2017)</p> <ul style="list-style-type: none"> Green circle: Below 35 ng/L Yellow circle: Elevated 35 to 69 ng/L Red circle: Exceeds 69 ng/L 	<p>2017-2018 PFOA/PFOS LHA Drinking Water Results (S&W, 2018 - January 2018)</p> <ul style="list-style-type: none"> Green circle: Below 35 ng/L Yellow circle: Elevated 35 to 69 ng/L Red circle: Exceeds 69 ng/L
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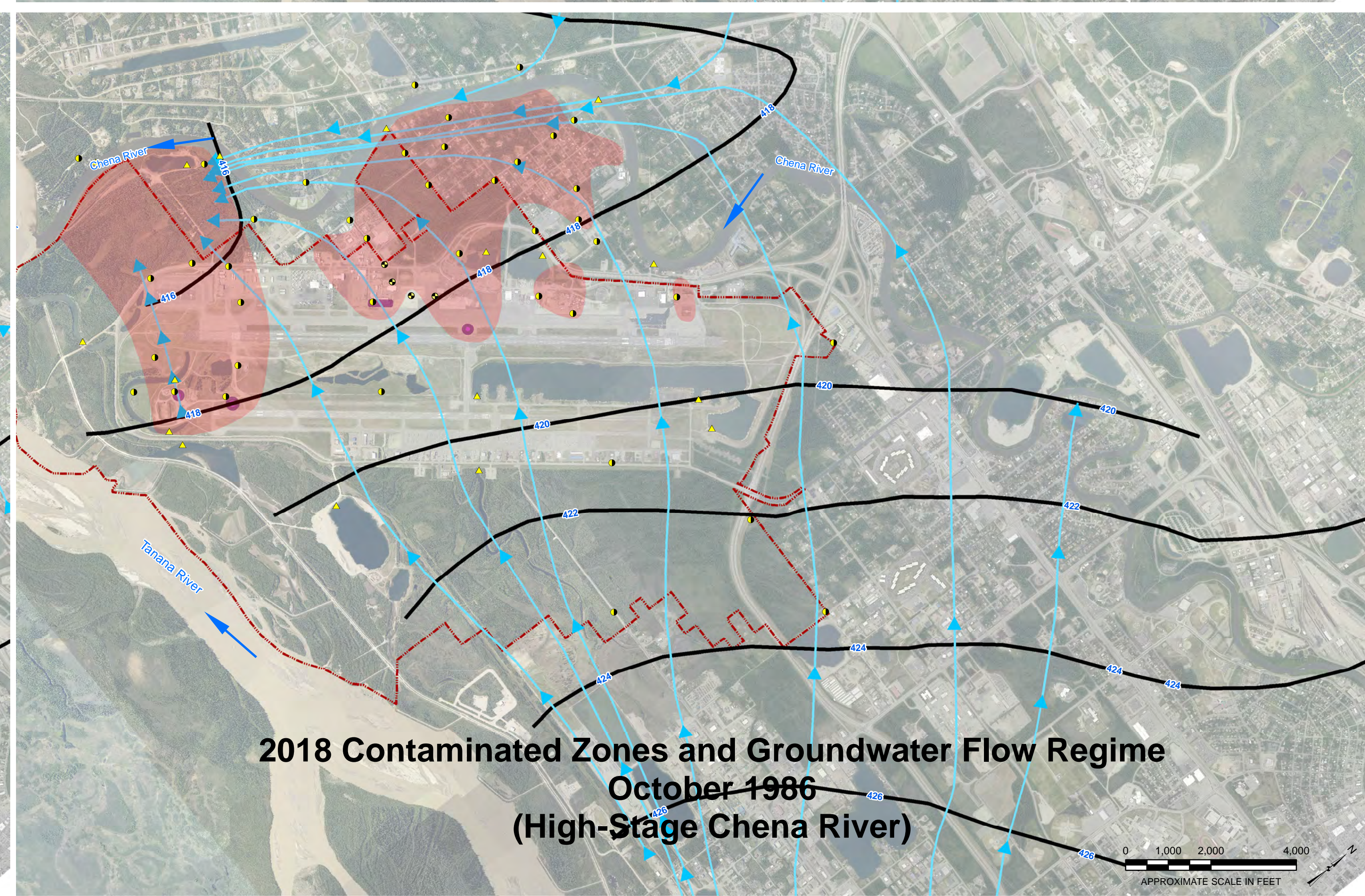
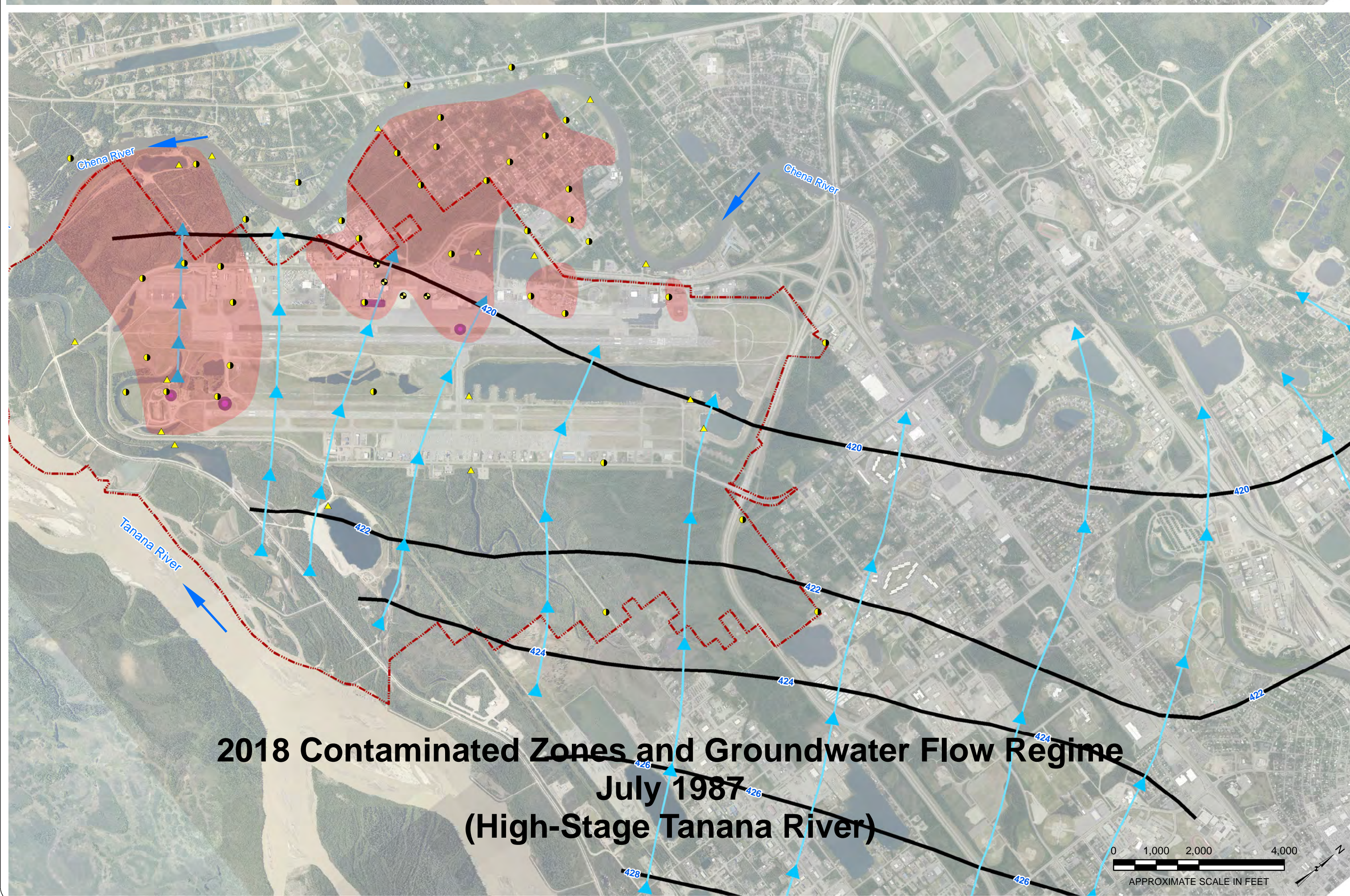
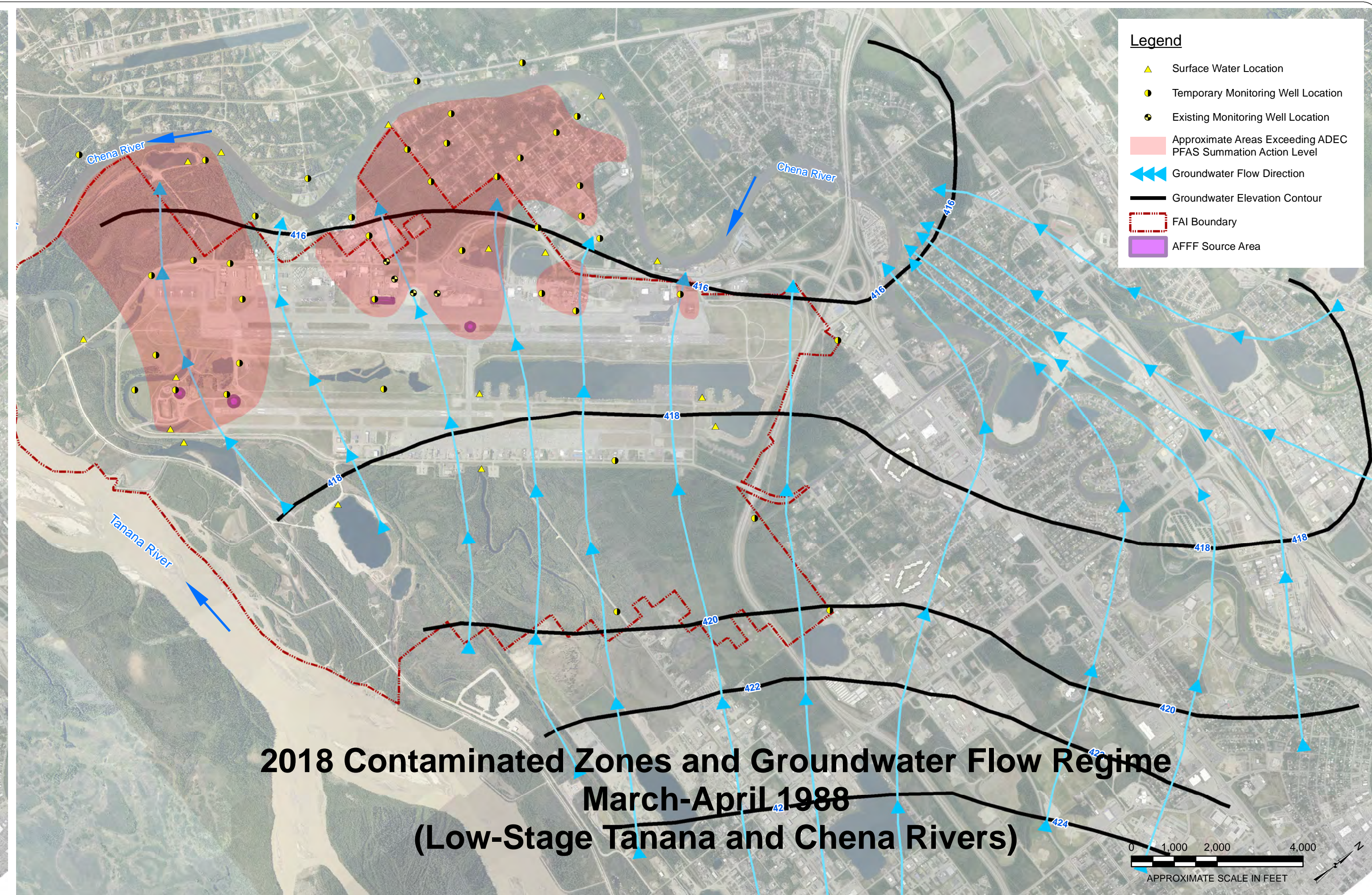
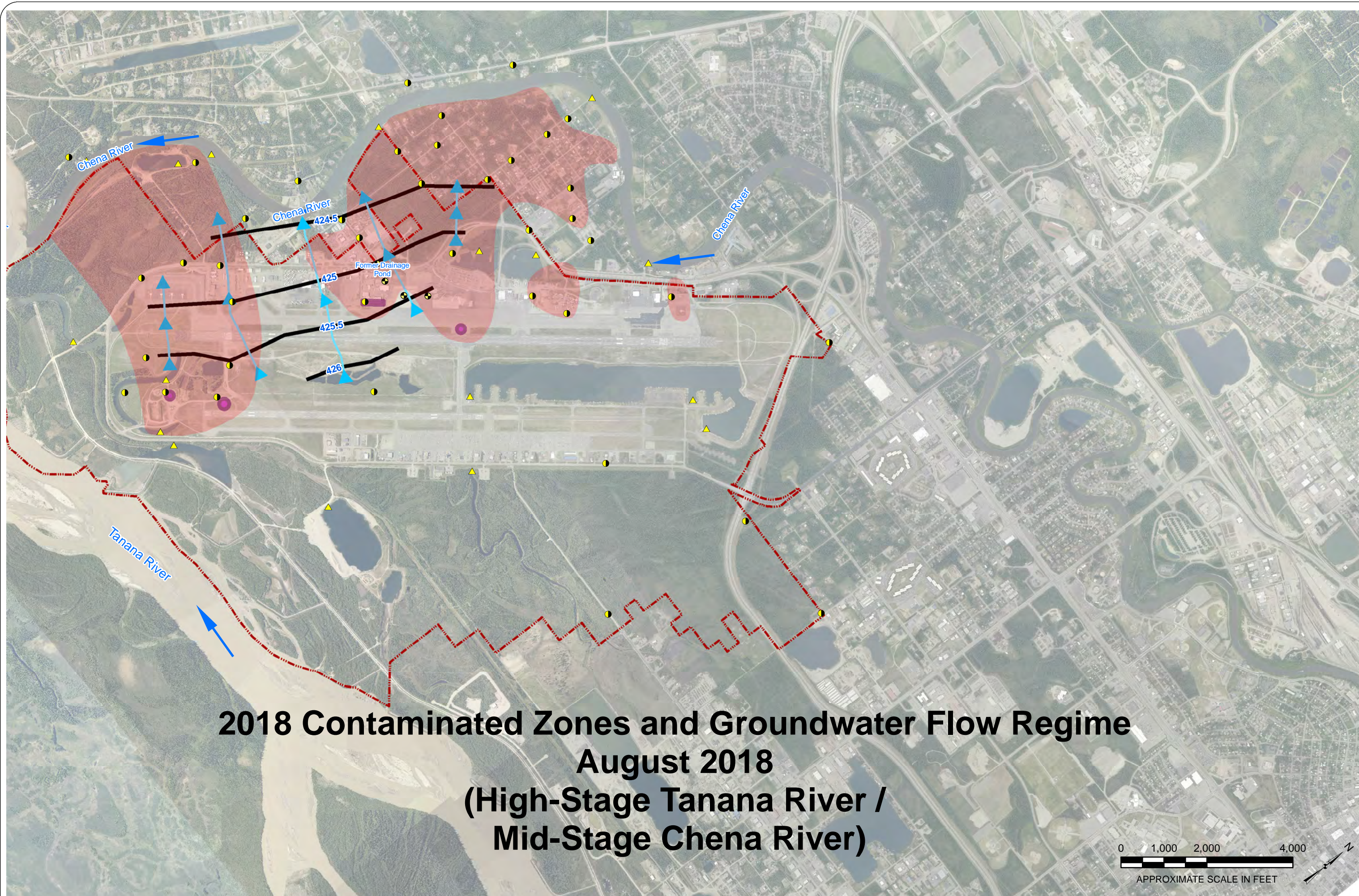
FB: N/A
 GRID: FAIRBANKS D-2
 PROJ.NO.: 2393.03
 DWG.: A-17

FAIRBANKS INTERNATIONAL AIRPORT
 2018 PFAS GW CHARACTERIZATION
 APPROXIMATE PFAS GROUNDWATER
 CONTAMINATED ZONE MAPPING

Notes:
 1. Groundwater contours for 2018 were based on groundwater data collected from 13 August to 18 August 2018 and an elevation survey conducted in October 2018.
 2. Groundwater contaminated area boundaries are interpreted based on groundwater flow regimes shown on Drawing A-06 and the chemical information collected during this investigation. Significant uncertainty still exists on the precise horizontal boundaries for each contaminated area. The vertical extent of plumes across the study area could not be estimated based on data collected.
 3. Imagery from Pictometry 2012.

DWN: CDF
 CKD: KMM
 DATE: JAN 2019
 SCALE: AS SHOWN

Date Saved: 1/24/2019 9:53:15 AM by CFEI
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Legend

- ▲ Surface Water Location
- Temporary Monitoring Well Location
- Existing Monitoring Well Location
- Approximate Areas Exceeding ADEC PFAS Summation Action Level
- Groundwater Flow Direction
- Groundwater Elevation Contour
- FAI Boundary
- AFFF Source Area

N/A
 FB: FAIRBANKS D-2
 GRID: 2383.03
 PROJNO: A-18
 FAIRBANKS INTERNATIONAL AIRPORT
 2018 PFAS CONTAMINATED ZONES OVERLAIN
 WITH GROUNDWATER FLOW DIRECTION
 Notes:
 1. Groundwater mapping notes, data sources, and other information are provided on Drawing A-06.
 2. Plume boundaries are approximate and are suspected to vary seasonally.
 DWN: CDF
 CKD: KWM
 DATE: JAN 2019
 SCALE: AS SHOWN

APPENDIX B

TEST BORING LOGS

STANDARD SYMBOLS

SYMBOL	NAME	PARTICLE SIZE	SYMBOL	NAME
	CLAY	< 0.002mm, Plastic		ORGANICS
	SILT	0.002mm, - #200		ICE
	SAND	#200, - #4		ICE W/SOIL INCLUSIONS
	GRAVEL	#4, - 3"		ICE LENSE IN SOIL
	COBBLES & BOULDERS	3" - 12" & > 12"		ICE CRYSTALS IN CLAY

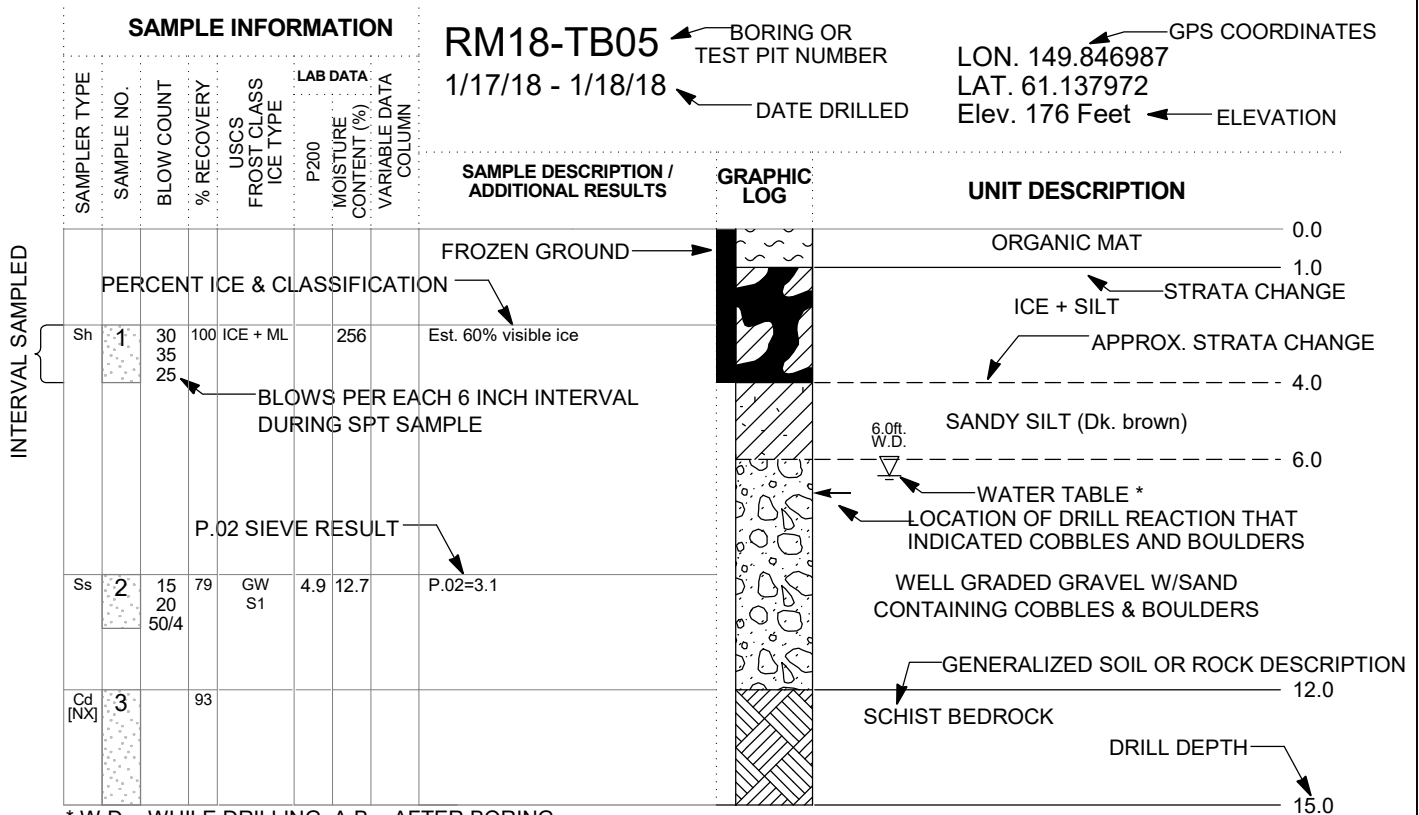
(The symbols shown above are frequently used in combinations, e. g. SILTY GRAVEL W/SAND)

SAMPLER TYPE SYMBOLS

A Auger Sample	MC 1.5 In. I.D. Macro-core	Ss 1.4 In. Split Spoon w/140 lb. Manual Hammer
C Cuttings Sample	MC73.0 In. I.D. Macro-core	Ssa 1.4 In. Split Spoon w/140 lb. Auto Hammer
Cd Double Tube Core Barrel	Sh 2.5 In. Split Spoon w/340 lb. Manual Hammer	Tm Modified Shelby Tube
Cs Single Tube or Auger Core	Sha 2.5 In. Split Spoon w/340 lb. Auto Hammer	Ts 3.0 In. Shelby Tube
Ct Triple Tube Core Barrel	Sl 2.5 In. Split Spoon w/140 lb. Hammer	[XX] Sampler ID (Rock Core - NX, NQ, etc.)
G Grab Sample		

NOTE: Sampler types are either noted above the boring log or adjacent to it at the respective depth. An individual log may not utilize all of the items listed.

TYPICAL BORING AND TEST PIT LOG



* W.D. - WHILE DRILLING, A.B. - AFTER BORING

** - REFER TO SAMPLER SYMBOL (Ss, Sh, ETC.) FOR SAMPLER I.D. & HAMMER WEIGHT/TYPE

NOTE: Water levels shown on the boring logs are the levels measured in the boring at the times indicated.

* (DRAWING 1 NEW EXPLAN OF SELECTD SYM (DOT&PF)) 12/6/18 01:45 PM

DWN:	B.M.M.
CKD:	C.H.R.
DATE:	GENERAL
SCALE:	NONE

PREPARED BY: R&M CONSULTANTS, INC.

EXPLANATION OF SELECTED SYMBOLS

FB:	N/A
GRID:	N/A
PROJ.NO:	GENERAL
DWG.NO:	B-02

SOILS CONSISTENCY AND SYMBOLS

CLASSIFICATION: Identification and classification of the soil is accomplished in accordance with the ASTM version of the Unified Soil Classification System. When laboratory testing data on material passing the 75-mm sieve is available Standard D 2487 (Classification of Soils for Engineering Purposes) is used and when laboratory data is not available D 2488 (Visual-Manual Procedure) is used. This classification system identifies three major soil divisions: coarse-grained soils, fine-grained soils, and highly organic soils. These three divisions are further subdivided into a total of 15 basic soils groups. Based on the results of visual observations and prescribed laboratory tests, a soil is catalogued according to the basic soil groups, assigned a group symbol(s) and name, and thereby classified. Flow charts contained in the two standards can be used to assign the appropriate group symbol(s) and name.

SOIL DENSITY/CONSISTENCY - CRITERIA: Soil density/consistency as defined below and determined by normal field and laboratory methods applies only to non-frozen material. For these materials, the influence of such factors as soil structure, i.e. fissure systems shrinkage cracks, slickensides, etc., must be taken into consideration in making any correlation with the consistency values listed below. In permafrost zones, the consistency and strength of frozen soil may vary significantly and inexplicably with ice content, thermal regime and soil type.

COARSE GRAINED (DOT&PF 2007)

<u>Relative Density</u>	<u>N * (blows/FT.)</u>
Very loose	0 - 4
Loose	5 - 10
Medium dense	11 - 30
Dense	31 - 50
Very dense	>50

FINE GRAINED (ASTM D2488)

<u>Consistency</u>	<u>Thumbnail Test</u>
Very soft	Thumb > 1 in.
Soft	Thumb = 1 in.
Firm	Thumb = 1/4 in.
Hard	Thumbnail indents
Very hard	Thumbnail will not indent

* Standard Penetration "N": Blows per 12 inches of a 140-pound manual hammer (lifted with rope & cathead) falling 30 inches on a 2-inch O.D. split-spoon sampler except where noted. Blow counts presented on test boring logs are direct field values (i.e. they have not been corrected to account for hammer efficiency, borehole diameter, sampling method, or rod length)

KEY TO TEST RESULTS

DD - Dry Density	PP - Pocket Penetrometer
LL - Liquid Limit	P200 - % Passing No. 200 Screen
MC - Moisture Content	P.02 - % Passing 0.02 mm
Org - Organic Content	P.005 - % Passing 0.005 mm
PI - Plastic Index	P.002 - % Passing 0.002 mm
PL - Plastic Limit	

* (DRAWING: I NEW EXPLAN OF SELECTD SYM (DOT&PF)) 12/6/18 01:45 PM

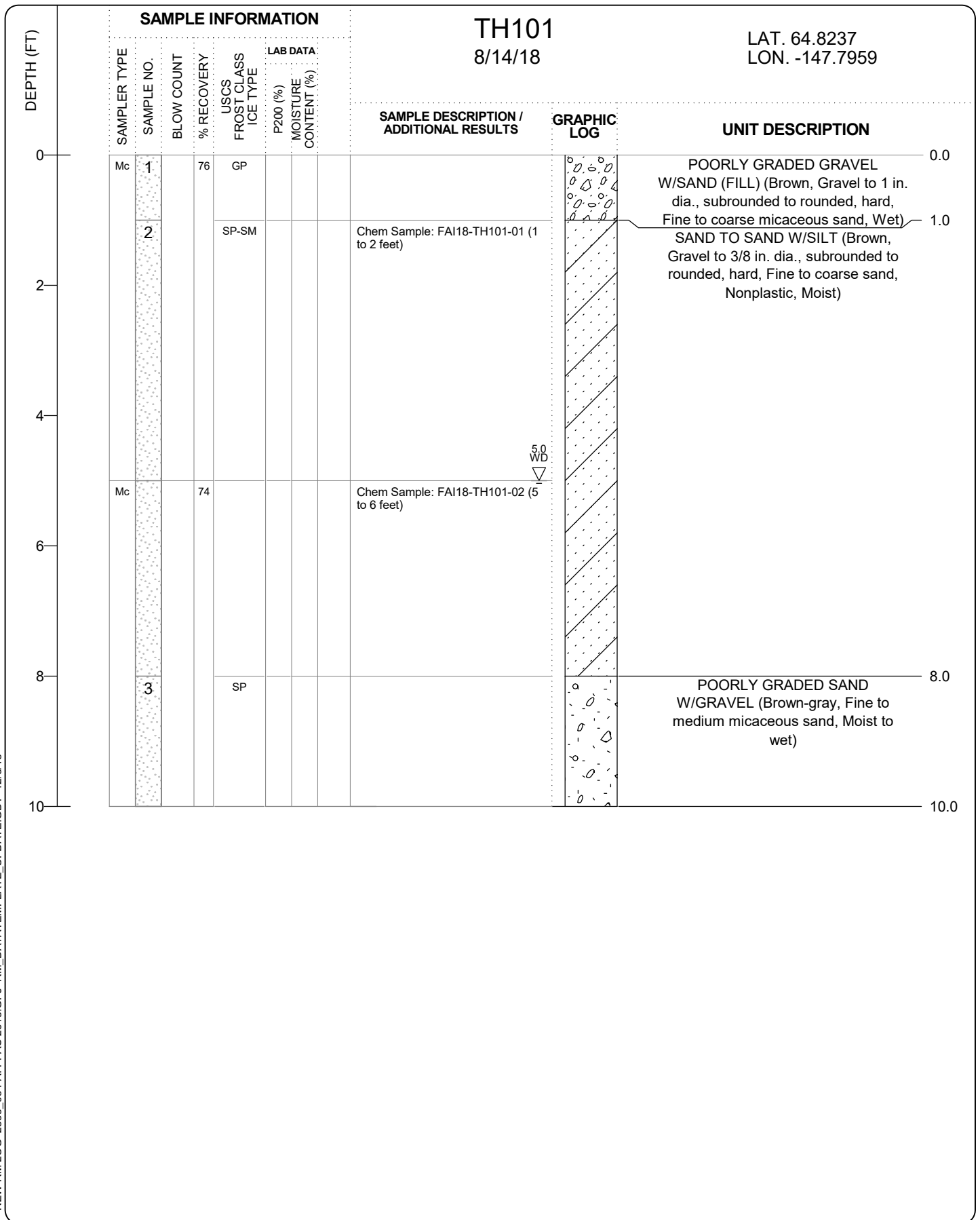
DWN:	B.M.M.
CKD:	C.H.R.
DATE:	GENERAL
SCALE:	NONE

PREPARED BY: R&M CONSULTANTS, INC.

GENERAL NOTES

FB:	N/A
GRID:	N/A
PROJ.NO:	GENERAL
DWG.NO:	B-01

NEW RM LOG 2393_03 FAI PFAS 2018.GPJ RM_DATATEMPLATE_UPDATE.GDT 12/6/18



DWN:	C.D.F
CKD:	C.H.R.
DATE:	DEC. 2018
SCALE:	SHOWN

PREPARED BY: R&M CONSULTANTS, INC.

PFAS GW CHARACTERIZATION
 FAIRBANKS, ALASKA
 LOG OF TEST BORING
 TH101

FB:	NA
GRID:	FAIRBANKS
PROJ.NO:	2393.03
DWG.NO:	B-03

NEW RM LOG 2393_03 FAI PFAS 2018.GPJ RM_DATATEMPLATE_UPDATE.GDT 12/6/18

DEPTH (FT)	SAMPLE INFORMATION						TH102 8/17/18		LAT. 64.7991 LON. -147.8815	
	SAMPLER TYPE	SAMPLE NO.	BLOW COUNT	% RECOVERY	USCS FROST CLASS ICE TYPE	LAB DATA	SAMPLE DESCRIPTION / ADDITIONAL RESULTS	GRAPHIC LOG	UNIT DESCRIPTION	
0	Mc	1		68	GW					Chem Sample: FAI18-TH102-01 and FAI18-TH102-02 (1 to 1.5 feet)
2										
4		2			SM		Chem Sample: FAI18-TH102-03 (4.5 to 5 feet)		4.0	
6										
8	Mc	3		60	SP-SM				8.0	
10										





DWN:	C.D.F
CKD:	C.H.R.
DATE:	DEC. 2018
SCALE:	SHOWN

PREPARED BY: R&M CONSULTANTS, INC.

PFAS GW CHARACTERIZATION
FAIRBANKS, ALASKA
LOG OF TEST BORING
TH102

FB:	NA
GRID:	FAIRBANKS
PROJ.NO:	2393.03
DWG.NO:	B-04

NEW RM LOG 2393_03 FAI PFAS 2018.GPJ RM_DATATEMPLATE_UPDATE.GDT 12/6/18

DEPTH (FT)	SAMPLE INFORMATION						SAMPLE DESCRIPTION / ADDITIONAL RESULTS	GRAPHIC LOG	UNIT DESCRIPTION	
	SAMPLER TYPE	SAMPLE NO.	BLOW COUNT	% RECOVERY	USCS FROST CLASS ICE TYPE	LAB DATA P200 (%) MOISTURE CONTENT (%)				
0	Mc	1		76					ASPHALT	0.0
		2			GW				WELL GRADED GRAVEL W/SAND (FILL) (Brown-gray, Gravel to 2 in. dia., subrounded, hard, Fine to coarse sand, Dry to wet)	0.4
2							Chem Sample: FAI18-TH103-01 (1 to 2 feet)			
4										
6	Mc			70						
							Chem Sample: FAI18-TH103-02 (6.5 to 7.5 feet)			
8										
10										

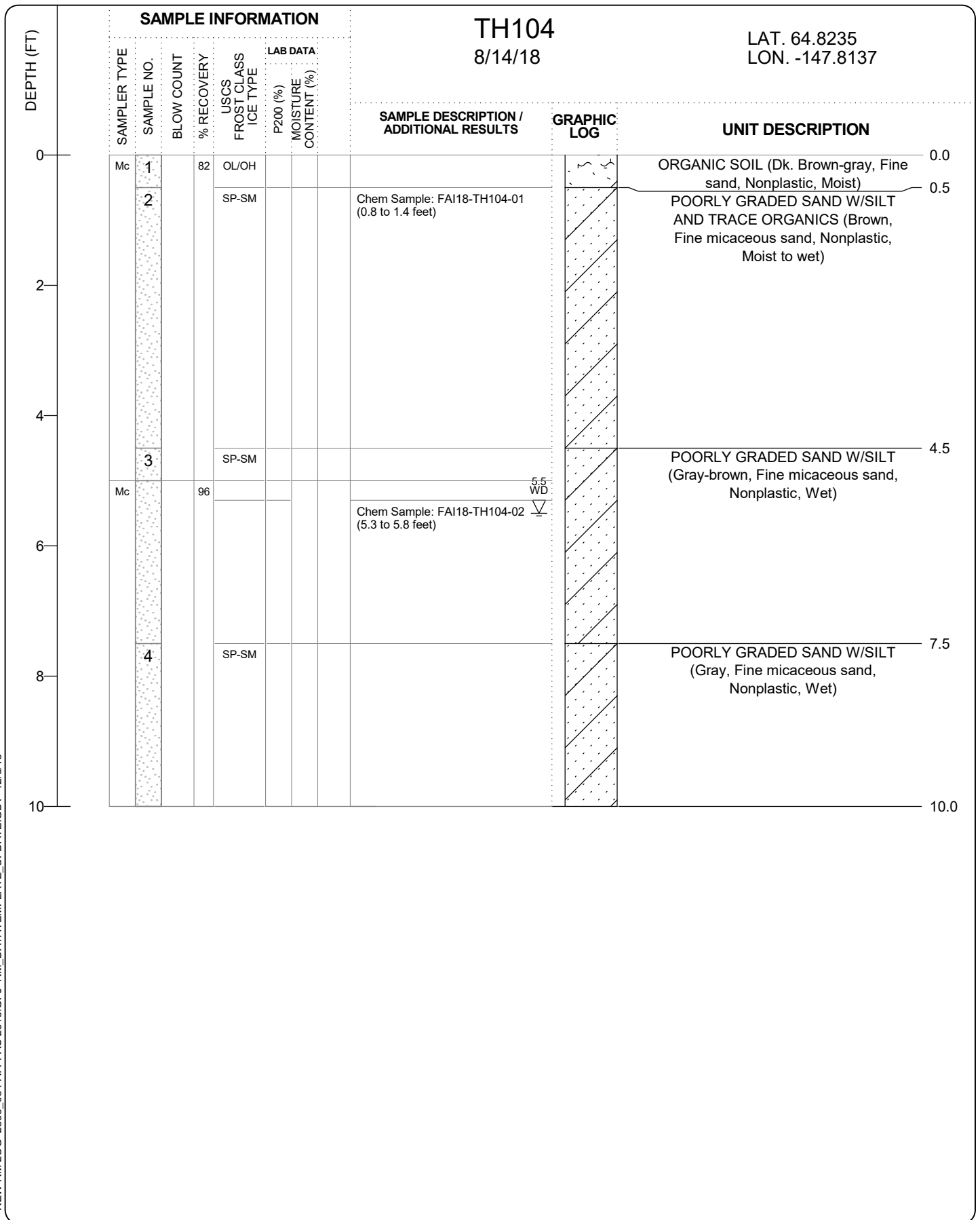
DWN:	C.D.F
CKD:	C.H.R.
DATE:	DEC. 2018
SCALE:	SHOWN

PREPARED BY: R&M CONSULTANTS, INC.

PFAS GW CHARACTERIZATION
 FAIRBANKS, ALASKA
 LOG OF TEST BORING
 TH103

FB:	NA
GRID:	FAIRBANKS
PROJ.NO:	2393.03
DWG.NO:	B-05

NEW RM LOG 2393_03 FAI PFAS 2018.GPJ RM_DATATEMPLATE_UPDATE.GDT 12/6/18



DWN:	C.D.F
CKD:	C.H.R.
DATE:	DEC. 2018
SCALE:	SHOWN

PREPARED BY: R&M CONSULTANTS, INC.

PFAS GW CHARACTERIZATION
FAIRBANKS, ALASKA
LOG OF TEST BORING
TH104

FB:	NA
GRID:	FAIRBANKS
PROJ.NO:	2393.03
DWG.NO:	B-06

APPENDIX C

FIELD NOTES

VOI #1

FAI PFAS



Rite in the Rain

ALL-WEATHER
UNIVERSAL

Nº 373-MX

START: 8/10/2018

STOP: 10/6/2018

QEP: C. FELL (CF)

R&M Consultants, Inc



Name REM CONSULTANTS
C. FELL

Address 9101 VANGUARD DR
AUCHTONAGE AK 99507

Phone 907 522 1707

Email cfell@rmconsult.com

Projects FAT GW INVEST 2018



RiteintheRain.com

FAT PFAS
2393.03

X

8/10/18
C. FELL

~~1000~~ C. FELL BEGAN SURFACE WATER SAMPLING

WX: 53°F, CALM, M. CLOUDY

ARRIVED AT SW111

1028 *SAMPLE*

FAT 18-SW111

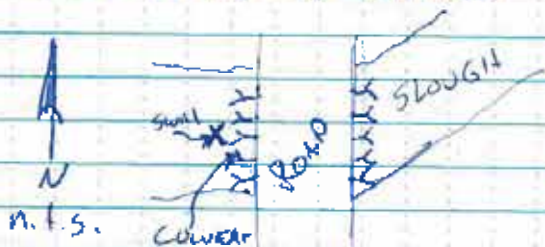
C. FELL

8/10/18

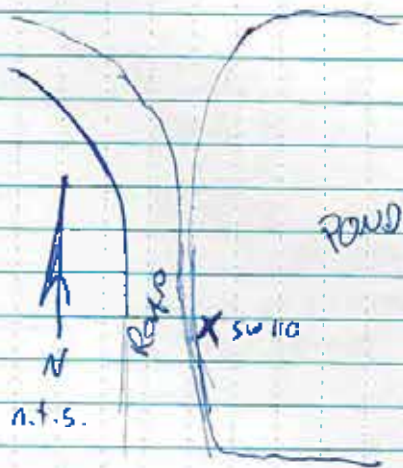
PFAS (EPA 537 MODIFIED) 2 250ml HOPE

PLACED IN PRE-CHILLED COOLER

COLLECTED BY DIPPING



1032 MOVING TO SW110



1037 *SAMPLE*

FAT 18-SW110

C. FELL

8/10/18

PFAS (EPA 537 MODIFIED) 2 250ml HOPE

PLACED IN PRE-CHILLED COOLER

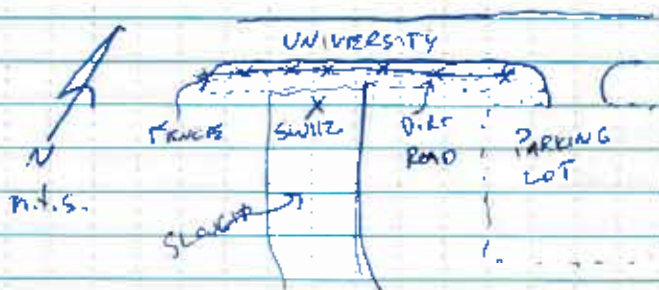
COLLECTED BY DIPPING

1040 MOVING TO SW112

FAT PFAS
2393.03

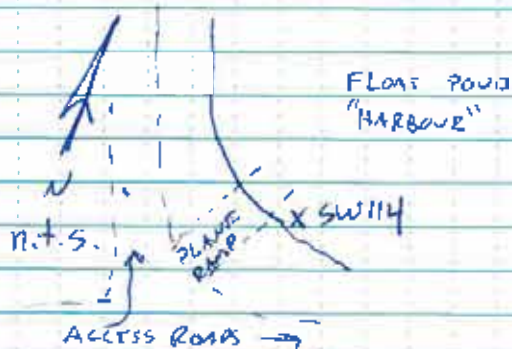
8/10/18
C.FELL

1059 *SAMPLE*
FAT 18 - SW112
C.FELL
8/10/18
PFAS (EPA 537 MOD) 2 250ml HDPE
PLACED IN PRECHILLED COOLER
DIPPING METHOD



1105 MOVING TO AOA SURFACE WATER LOCATIONS

1116 *SAMPLE*
FAT 18 - SW114
C.FELL
8/10/18
PFAS (EPA 537 MODIFIED) 2 850ml HDPE
PLACED IN PRECHILLED COOLER
DIPPING METHOD.



FAI PFAS
2393.03

8/10/18
C.FELL

1126 *SAMPLE*

FAI 18-SW113

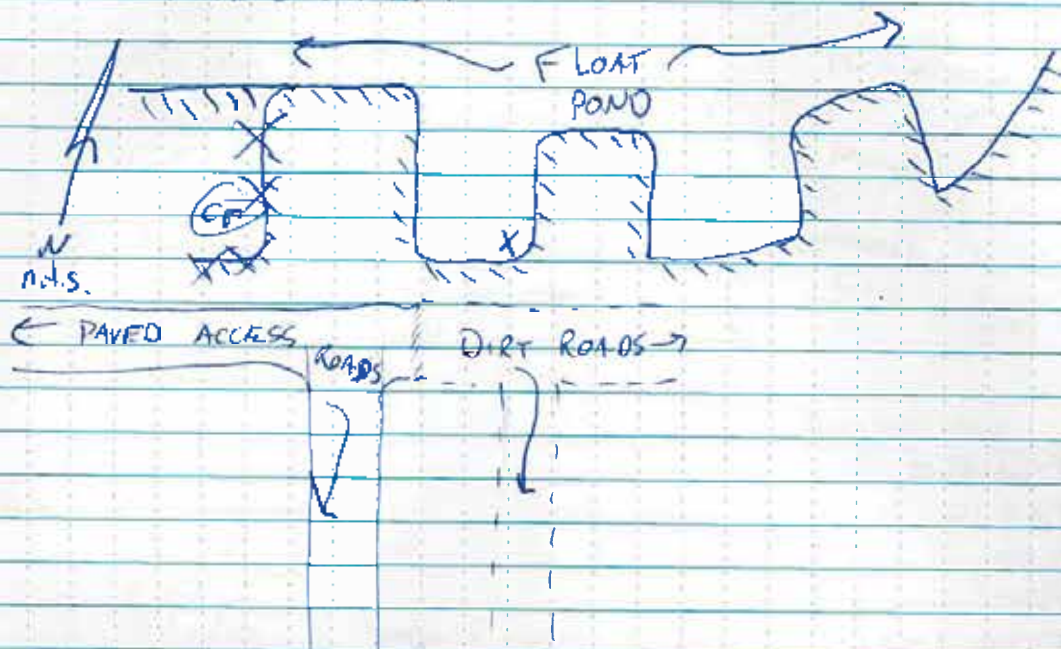
C.FELL

8/10/18

PFAS (EPA 537 MOD) 2 250ml HDPE

PLACED IN PRECHILLED COOLER

DIPPING METHOD



1142 *SAMPLE*

FAI 18-SW109

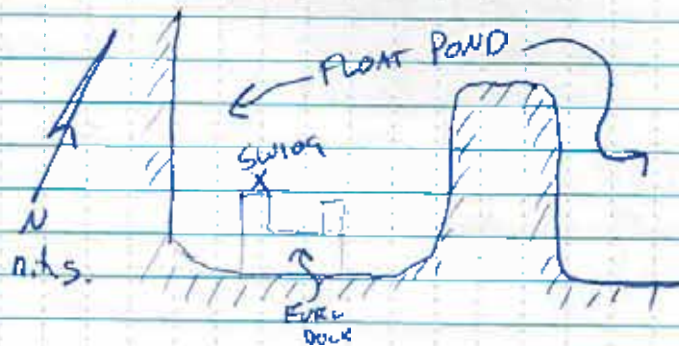
C.FELL

8/10/18

PFAS (EPA 537 MOD) 2 HDPE 250ml

PLACED IN PRECHILLED COOLER

DIPPING METHOD



Scale: 1 square = _____

(3)

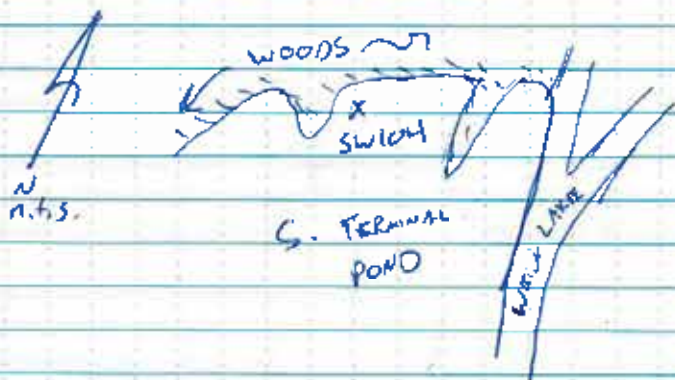
Plot on map

FAI PFAS
2393.03

8/10/18
C.FELL

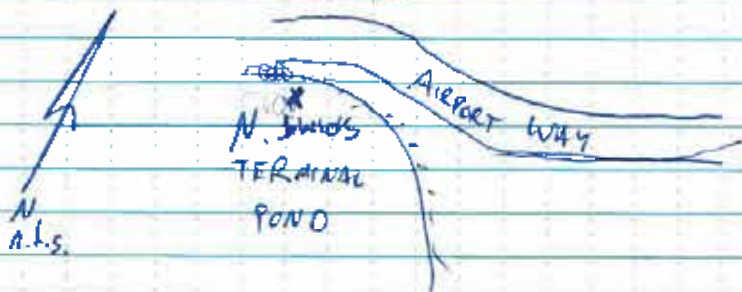
1207

SAMPLE
FAI 18-SW104
C.FELL
8/10/18
PFAS (EPA 537 Mod) 2 250ml HDPE
PLACED IN PRECHILLED COOLER
DIPPING METHOD



1223

SAMPLE
FAI 18-SW105
C.FELL
8/10/18
PFAS (EPA 537 MOD) 2 250ml HDPE
PLACED IN PRECHILLED COOLER
DIPPING METHOD



1240 COORDINATE ACCESS TO MW 18 w/ OPERATIONS (GREG)

1310 HEADING TO COLLECT SURFACE WATER SAMPLES
FROM NEAR FIRE TRAINING AREA

FAT PFAS
2393.03

8/10/18
C. FELL

1320 *SAMPLE*

FAT 18-SW107

C. FELL

8/10/18

PFAS (EPA 537 MOD)

PLACED IN PRECHILLED COOLER

PERISTALTIC PUMP

1341 *SAMPLE*

FAT 18-SW108

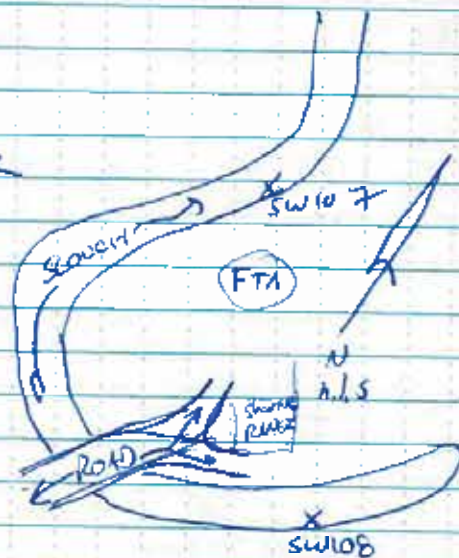
C. FELL

8/10/18

PFAS (EPA 537 MOD)

PLACED IN PRECHILLED COOLER

PERISTALTIC PUMP



1455 *SAMPLE*

FAT 18-MW18

C. FELL

8/10/18

PFAS (EPA 537 MOD)

PLACED IN PRECHILLED COOLER

PERISTALTIC PUMP

1519

ARRIVED AT TRAIL BREAKER KENNEL AFTER SPEAKING w/ MR. DAVE MONSON.

SAMPLE

1525 FAT 18-SW106 (PRIMARY)

1526 FAT 18-SW117 (DUPLICATE)

C. FELL

8/10/18

PFAS (EPA 537 MOD) 4 200 ml HOPE

PLACED IN PRECHILLED COOLER

DIP METHOD.

FAI PFAS
2393.03

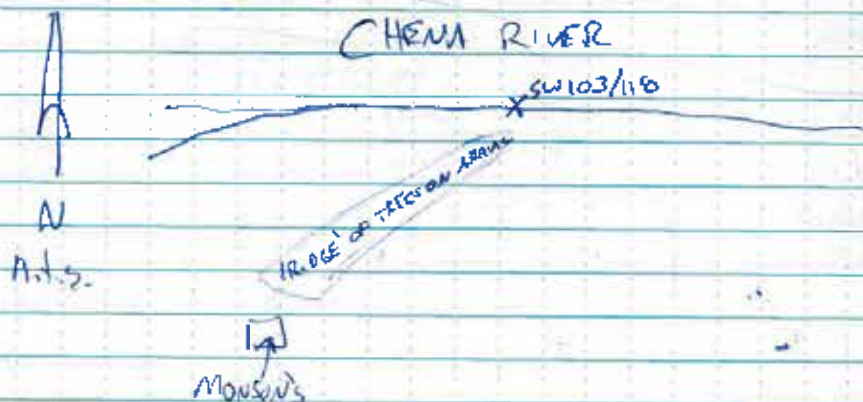
8/10/18
C.FELL

SAMPLE

1545 FAI 18-SW103 (PRIMARY)
1547 FAI 18-SW118 (DUPLICATE)

C.FELL
8/10/18

PFAS (EPA 537 MOD) 4 250ml HOPE
IMMEDIATELY PLACED IN PRE CHILLED COOLER
DIP METHOD



1603 LEAVING THE MONSON'S PROPERTY

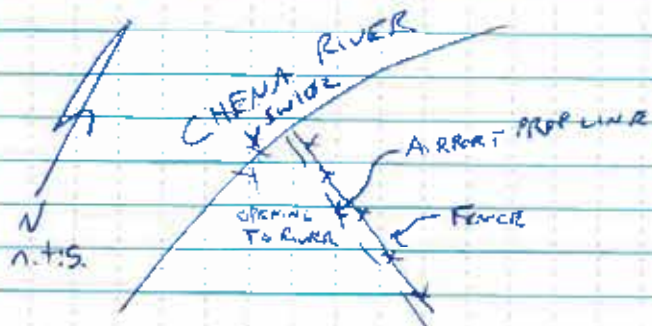
1720 COORDINATING UTILITY LOCATES

1724 *SAMPLE*

FAI 18-SW102

C.FELL
8/10/18

PFAS (EPA 537 MOD) 2 250ml HOPE
PLACED IN PRE CHILLED COOLER
DIP METHOD



Scale: 1 square = _____

(2)

FAT PFAS
2393.03

8/10/18
C. FELL

1759

SAMPLE

FAT18-SW115

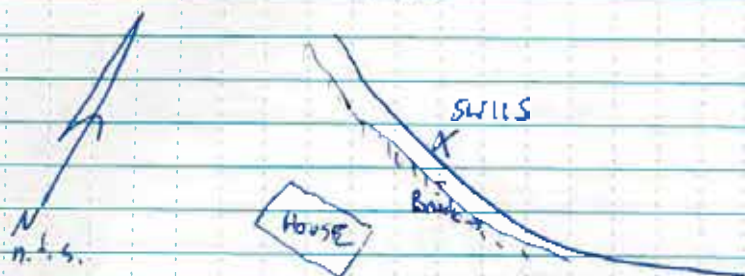
C. FELL

8/10/18

PFAS (EPA 537 Mod) 2 250ml HDPE

PLACED IN PRE CHILLED COOLER

DIP METHOD



SPOKE WITH LANDOWNER (HAROLD) BEFORE ENTRY HE
NOTIFIED HIS TENANTS AND GAVE PERMISSION FOR RSN TO
ACCESS THE RIVER FROM HIS LAND.

1810

C. FELL OFF SITE FOR DAY

[Large scribbled signature]
CHRISTOPHER D. FELL
8/10/18

FAE PFAS
2393.03

X

8/11/18
C.FELL

0700 C.FELL CONTINUING SW & GW SAMPLING.

TASKS PER DAY

- SW 101
- SW 116 (CALL LANDOWNER FOR ACCESS AT 0930)
- MW 15
- MW 30R
- MW 34

WX: CLEAR/SUNNY, 40s F, CALM

0730 LOCATING MW34

SETTING UP TO PURGE & SAMPLE (SEE SAMPLING FORM)

0852 *SAMPLE*

FAI 18 - MW 34

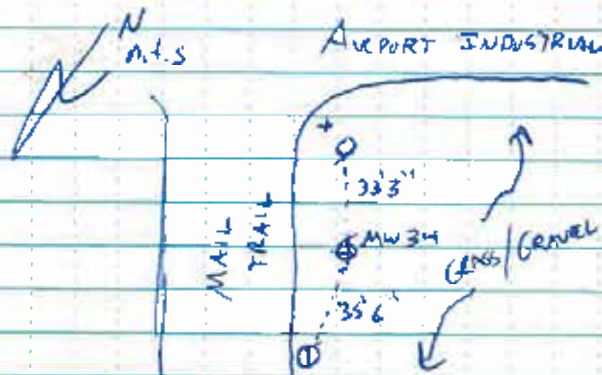
C.FELL

8/11/18

PFAS (EPA 537 MOD) 2 250ml HDPE

PLACED IN PRECHILLED COOLER

PERISTALTIC PUMP

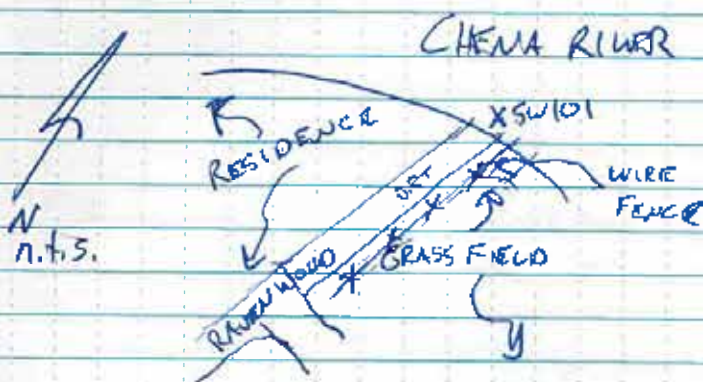


0912 FINISHED DECON WATER LEVEL INDICATOR (2x RINSSE AFTER ALLOW WASH) DECON AND PURGE H₂O CONTAINED IN 5 GALLON SEALED HD BUCKETS.

FAI PFAS
2393.03

8/11/18
C.FELL

0922 *SAMPLE*
FAI 18-SW101
C.FELL
8/11/18
PFAS (EPA 537 MOD) 2 250ml HOPE
PLACED IN PRE CHILLED COOLER
DID METHOD



0926 CALLED PROPERTY OWNER ON TALL SPRUCE ABOVE ACCESSING
THE CHENA RIVER FROM THEIR PROPERTY TO COLLECT
SW116 - NO ANSWER - LEFT MESSAGE

1259 *SAMPLE*
FAI 18-SW116
C.FELL
8/11/18
PFAS (EPA 537 MOD) 2 250ml HOPE
PLACED IN PRE CHILLED COOLER

1008 MOVED TO MW30R TO SAMPLE

1024 BEGAN PURCHASE OF MW30R
SEE SEPARATE SAMPLING/PURGE FORM FOR DETAILS

FAT PFAS
2393.03

8/11/18
C.FELL

1142^(CS)

SAMPLE

1210

FAT 18-MW30R

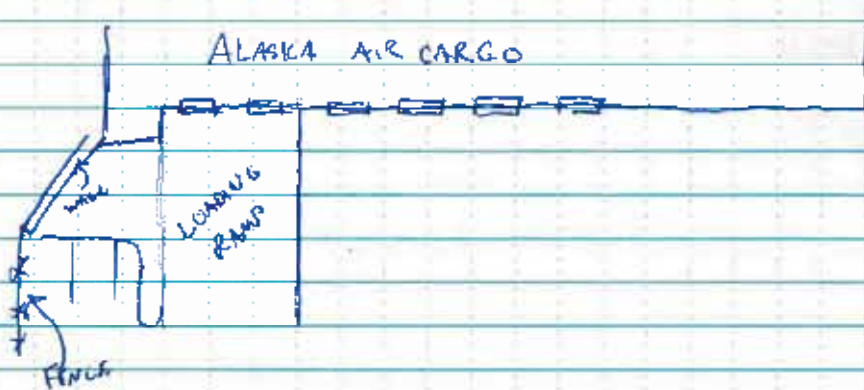
C.FELL

8/11/18

PFAS (EPA 537 MOD) 2 250ml HOPE

PLACED IN PRECHILLED COOLER.

PERISTALTIC PUMP



⊕ MW30R

1230 FINISHED CLEANUP & OREGON WATER LEVEL INDICATED AT MW30R.

PROPERTY OWNER AT 2712 TALL SPRUCE CALLED TO LET RKM KNOW THAT WE CAN ACCESS THE CHENA RIVER FROM THEIR PROPERTY. WE ARRANGED 1PM AS THE TIME OF ACCESS.

1307 LEAVING TALL SPRUCE ROAD.

1325 SETTING UP AT MW15

1335 BEGAN PURGING THE WELL

*SEE SAMPLING/PURGING FORM FOR DETAILS.

FAI PFAS
2393.03

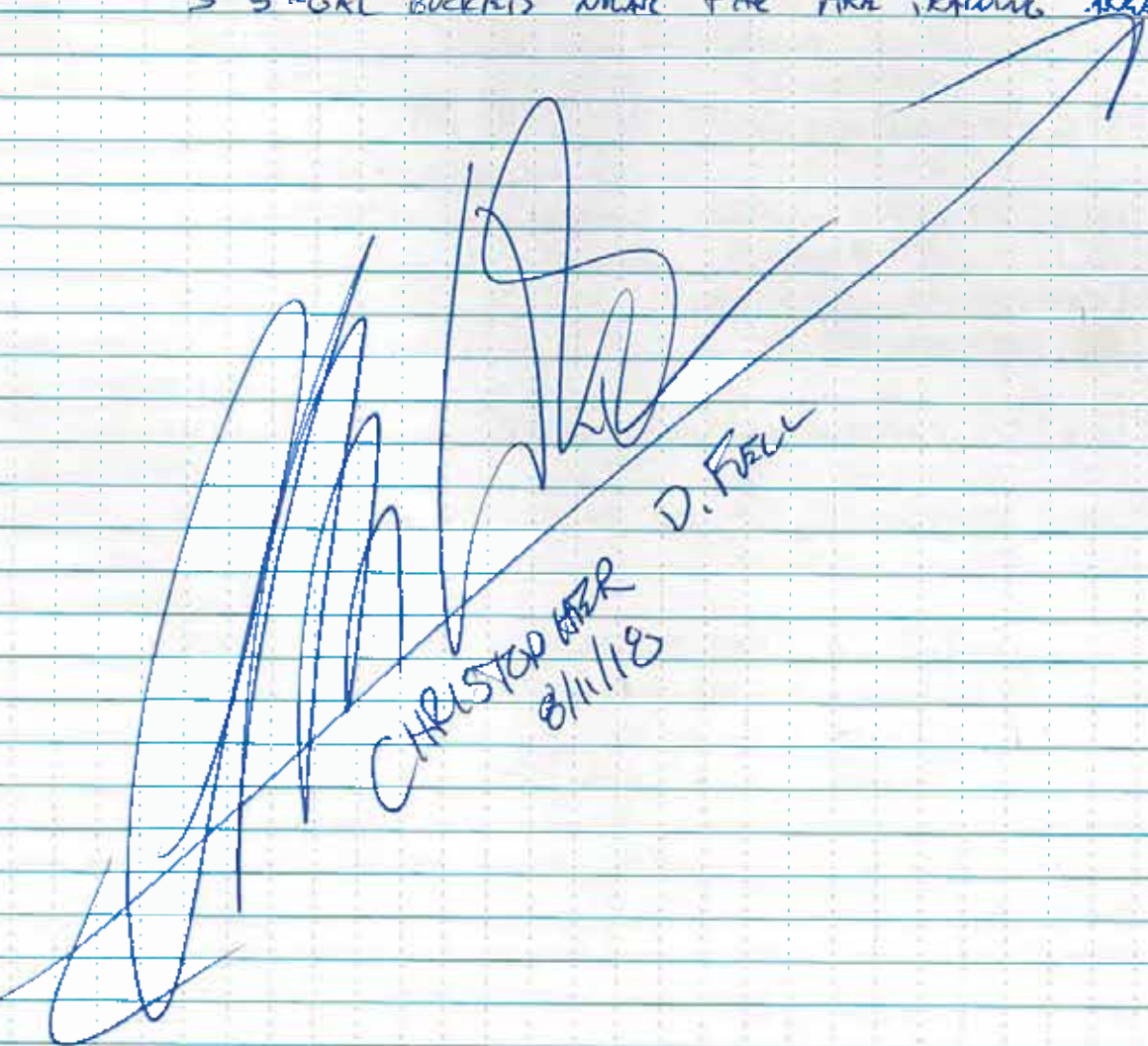
8/11/18
D. FELL

SAMPLE

1406 FAI18-MW15 (PRIMARY)
1408 FAI18-MW38 (DUPLICATE)
D. FELL
8/11/18
PFAS (EPA 537 MOD) 4 250ml HDPE

1420 FINISHED CLEANING UP AT MW15 & DECON OF
WATER LEVEL INDICATOR (ALCOHOL WASH & 2 RINSERS)

1430 STAGED CONTAINERIZED DECON/PURGE WATER W/
3 5-GAL BUCKETS NEAR THE FIRE TRAINING AREA



CHRISTOPHER
8/11/18
D. FELL

FAI PFAS
2393. 03

X

8/13/18
C.FELL

0730 MEET w/ DISCOVERY DRILLING

TAILGATE

↳ CHRISTOPHER FELL	REM	QEP
↳ DEREK DELL	DISCOVERY	DRILLER
↳ MARLOW SCOTT	DISCOVERY	HELPER
↳ TU	DISCOVERY	HELPER

WX: SOs F, 0-2 MPH, M. CLOUDY

0815 VEHICLE ACCESS TO AIRFIELD

0815 DROPPED DRUMS AT FTA

0915 SETTING UP TO DRILL TWIZO → SPIG SCREEN IS 3.5 FT LONG

0945 START ADVANCING TWIZO → LEAD SECTION IS 4.18 FT

5 FT SECTIONS: IIII IIII IIII IIII IIII

$$125 + 4.18 \text{ FT} = 129.18 \text{ FT}$$

1015 TWIZO AT DEPTH - OPENING SCREEN

DROPPED ROPS DOWN HOLE, HAD TO REMOVE TOOLING AND RE-DRILL

1124 BACK TO DEPTH → OPENING SCREEN

1139 SCREEN EXTENDED, WAITING 30 MIN TO PURGE & SAMPLE

1515 FINISHED SAMPLING AT TWIZO

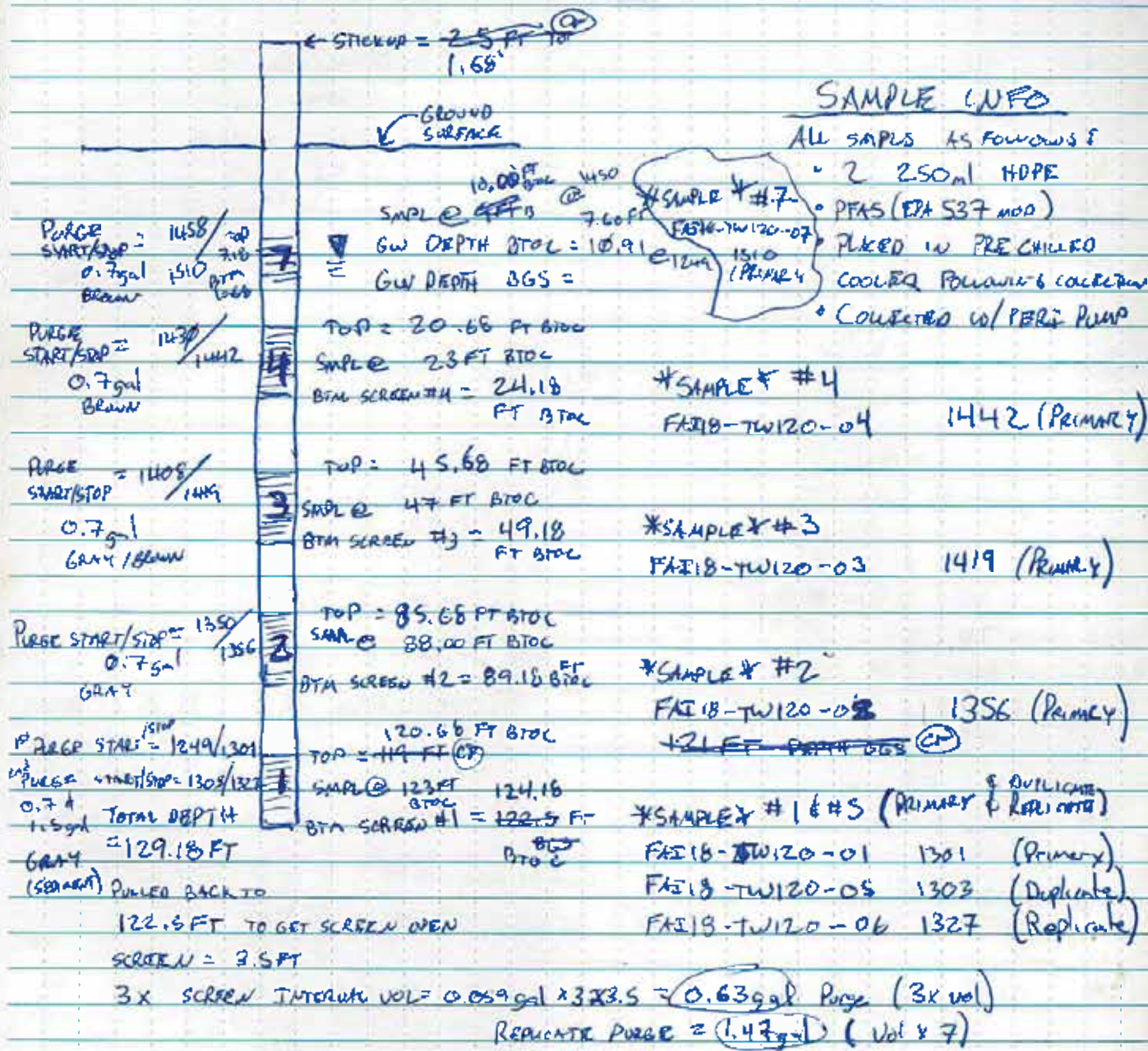
- 5 PRIMARY (10, 23, 47, 88, 123 FT BTDC)
- 1 DUPLICATE (123 FT BTDC)
- 1 REPLICATE (123 FT BTDC)

FINISHED CLEANUP AT TWIZO, MOVING TO TWIHA at SHAW'S MARE & CROWN

FAI PFAS
2393.03

8/13/16
C.FELL

TW120



[Signature]
CHRISTOPHER D. FELL

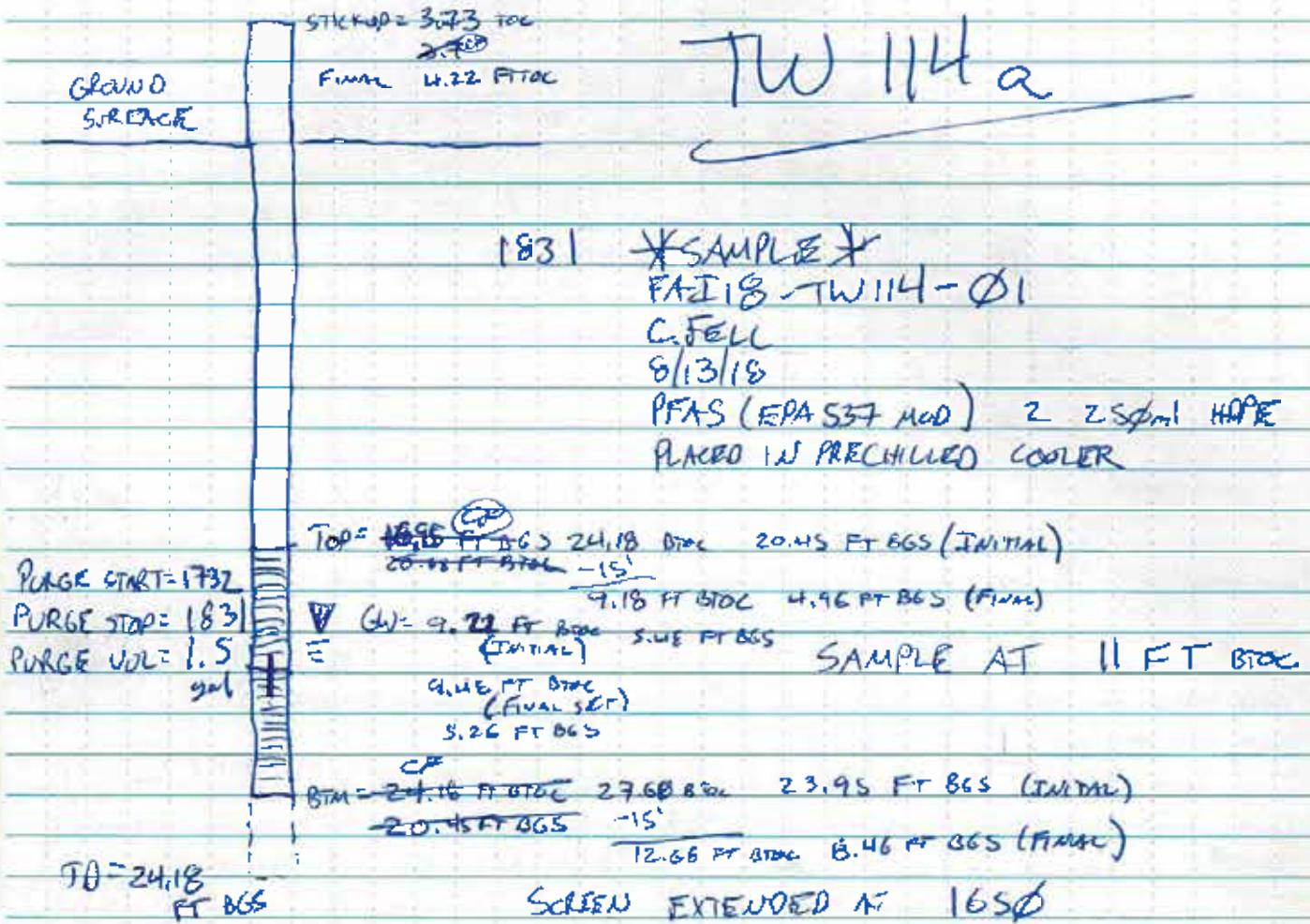
Scale: 1 square = _____

FAT PFAS
2393.03

8/13/18
C. Fell

1635 SETTING UP ON TW114a

1640 BEGAN ADVANCING TW114a w/ SP16 TOOLING



1702 PULLED SP16 UP 15 FEET

1640 FINISHED AT TW114a, CLEANUP AND DRAINAGE FOR DAY.

A LANDOWNER CAME AND SPOKE w/ ME WHILE SAMPLING ASKING ABOUT WHAT WE WERE DOING. I GAVE A BRIEF OVERVIEW AND PASSED ON ASHLEY'S CONTACT INFORMATION.

OFF SITE FOR THE DAY

FAI PFAS
~~6. PFAS~~ 2393.03

X

8/14/18
C. FELL

0730 TAILGATE W/ DISCOVERY DRILLING

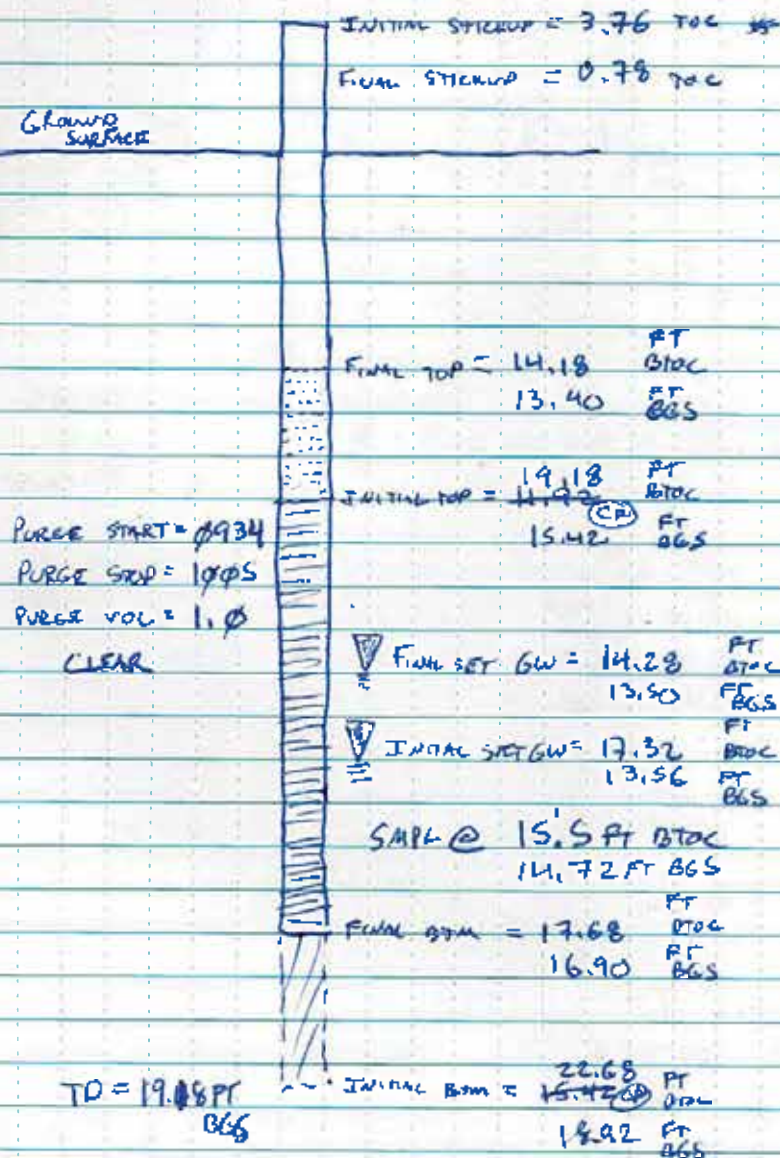
CHRISTOPHER FELL	RAM	DEP
DEREK DELL	DISCO	DRIVER
MARLOW SCOTT	DISCO	HELPER

WX: RAIN, 50s F, 2-4 MPH

0750 SETTING UP AT TW113a

TW113a

100S *SAMPLE*
FAI18 - TW113-01
C. FELL
8/14/18
PFAS/EP4 S37 MOD.)
2 250ml HOPE
PLACED IN PRECUTTED CONTAINER



0854 OPENED SCREEN
0926 REMOVED 1 SPT STICK

Scale: 1 square = _____

(15)

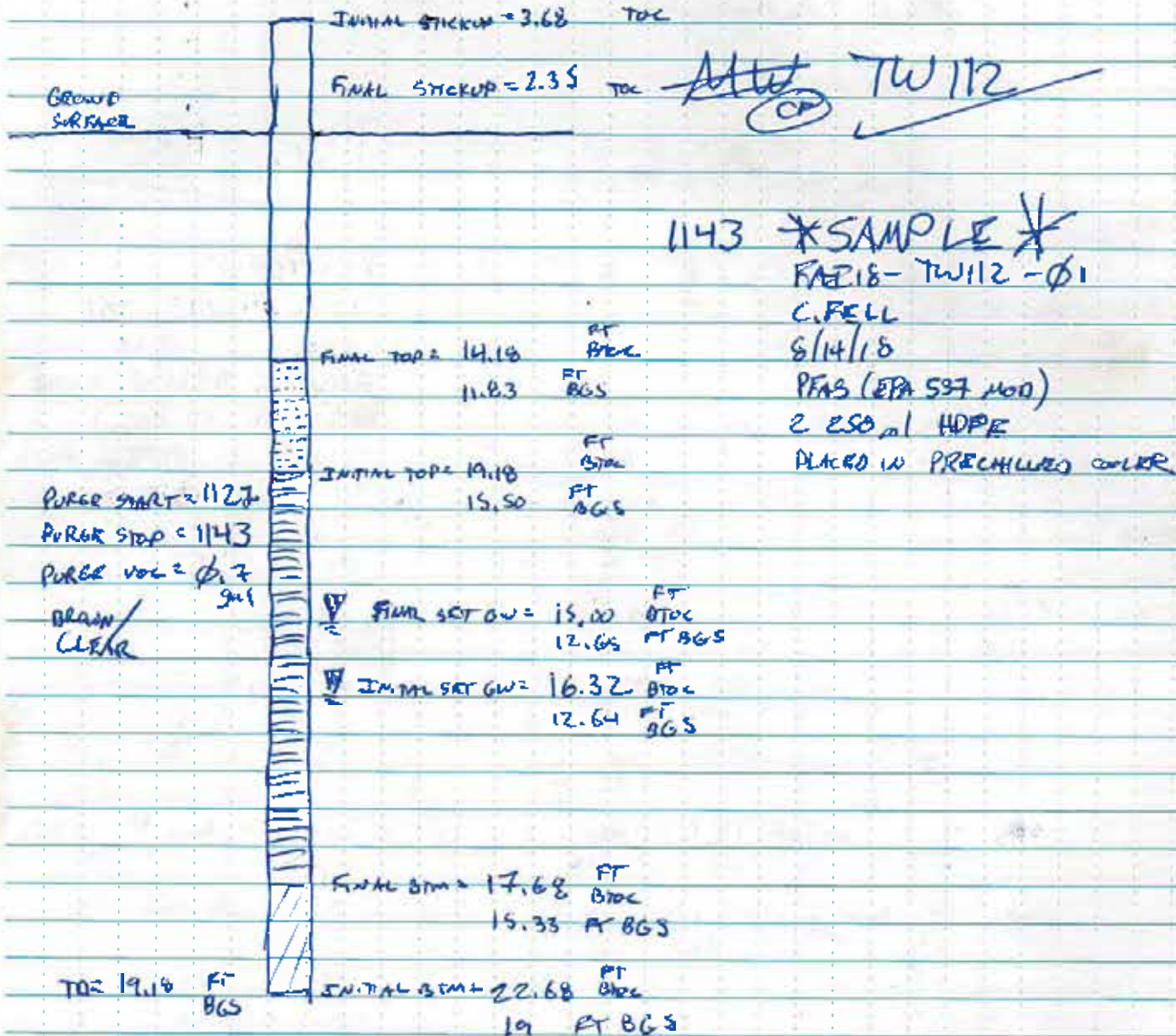
Return to Rain

FAC PFAS
2393.03

8/14/18
CPRU

1012 CLEANING UP AT TW113a, DECON WATER LEVEL INDICATOR
LOADING UP AND MOVING TO TW112

1030 SETTING UP AT TW112



1048 OPENED SCREEN
1110 REARMS 1 SFT STICK
1151 CLEANING UP AT TW112, DECON WATER LEVEL INDICATOR

Scale: 1 square = _____

(16)

FAI PFAS
2393.03

8/14/18
C. FELL

1215 LOADING UP AND MOVING TO TW124a/TH104

1314 SETTING UP AT TW124a/TH104 (SEE BORING LOG)



TW124a

1436 *SAMPLE*

FAI18-TW124-01
C. FELL
8/14/18
PFAS (EPA 537 MOD)
2 250 ml HDPE
PLACED IN PRECHILLED COOLER

FINAL FUP = 9.18 FT BTOC
5.28 FT BGS

INITIAL TOP = 11.18 FT BTOC
10.29 FT BGS

PURGE START = 1420

PURGE STOP = 1435

PURGE VOL = 0.7 gal

FINAL SET = 9.29 FT BTOC
GW 5.39 FT BGS

1404 *SOIL SAMPLE*

FAI18-TH104-01
0.8 - 1.4 FT BGS
C. FELL
8/14/18

BROWN GLASS

INITIAL SET = 9.28 FT BTOC
GW 5.39 FT BGS

SAMPLE @ = 10 1/2 FT BTOL
6.6 FT BGS

PFAS (EPA 537 MOD)
1 4oz HDPE
PLACED IN PRECHILLED COOLER

FINAL BML = 12.68 FT BTOC
8.78 FT BGS

1408 *SOIL SAMPLE*

FAI18-TH104-02
5.3 TO 5.8 FT BGS
C. FELL
8/14/18

TO = 14.18 FT BGS

INITIAL BML = 17.68 FT BTOC
13.79 FT BGS

PFAS (EPA 537 MOD)
1 4oz HDPE

1342 CROWING SCREEN

1440 CLEANING UP AT TW124a, DECON WATER LEVEL INDICATOR

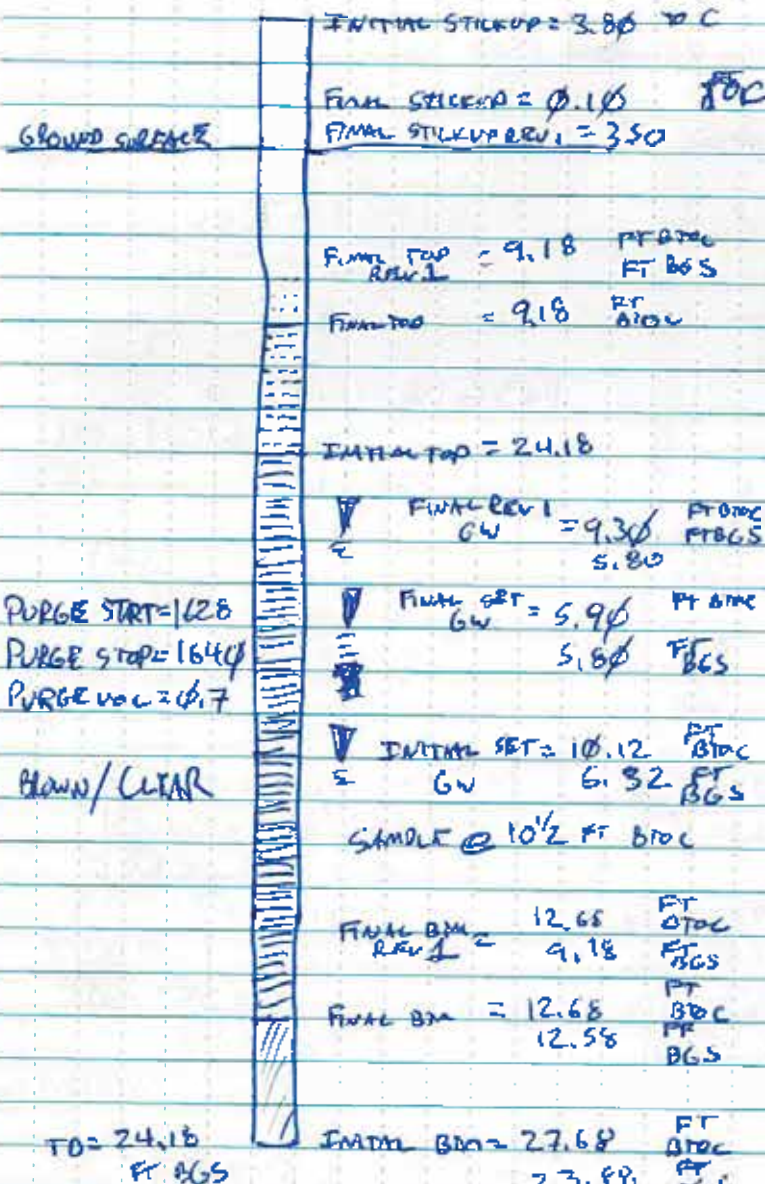
PLACED IN PRECHILLED COOLER

FAT PFAS
2393.03

8/14/18
C. FELL

1540 SETTING UP AT TW122a TH101

TW122a



GW SAMPLE
1640 FA18-TW122-01
C. FELL
8/14/18
PFAS (EPA 537 MOD)
2 250ml HDPE
PLACED IN PRECHILLED COOLER

SOIL SAMPLE
1611 FA18-TH101-01
1.0 to 2.0
C. FELL
8/14/18
PFAS (EPA 537 MOD)
2 250ml HDPE
PLACED IN PRECHILLED COOLER

SOIL SAMPLE
1613 FA18-TH101-02
5.0 to 6.0
C. FELL
8/14/18
PFAS (EPA 537 MOD)
2 250ml HDPE
PLACED IN PRECHILLED COOLER

PURGE START = 1628
PURGE STOP = 1640
PURGE VOL = 0.7

BLOWN/CLEAR

1548 OPEN SCREEN
- REMOVED 3 5 FOOT RODS (LISERS)
1621 - PUMPED BACK 3.5 FEET

1645 CLEANING UP AT TW122a, RECOVER WATER LEVEL WATCHER

1655 MOVING TO TW103a

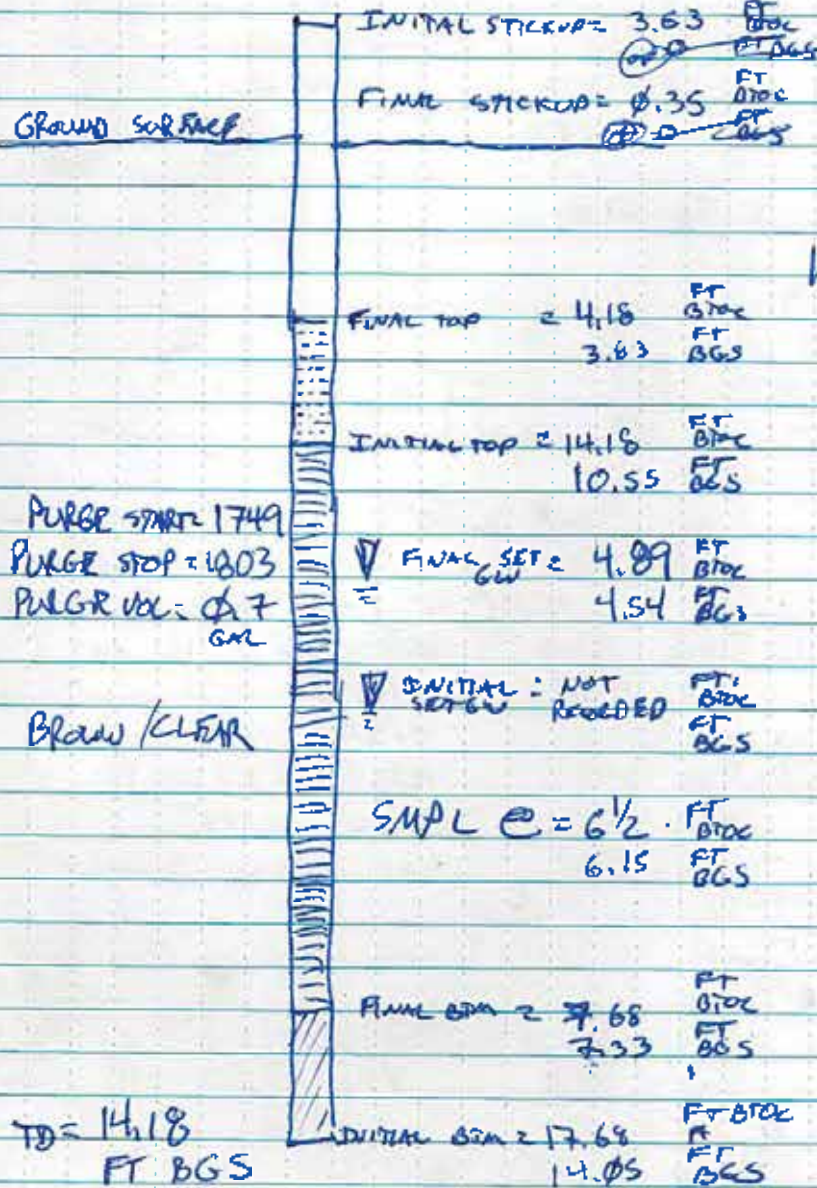
Scale: 1 square = _____

FAI PRAS
2393.03

8/14/18
C.FELL

1708 SETTING UP AT TW 103a

~~TW 103a~~



* GW SAMPLE *
1803 FAI18-TW103-01
C. FELL
8/14/18
PRAS (EPA S37 MOD)
2 250ml HOPE
PLACED IN PRECHILLED COOLER

1719 DEPLOYING SCREEN

1807 CLEANING UP AT TW 103a, ALLOW GROUNDWATER LEVEL TO RISE

1850 DEW/PURGE WATER PLACED IN A DRUM NEAR THE FTA.

1852 C. FELL OFFSITE.

Christopher D. Fell
8/14/18

FBI PFS
2393.03

X

8/15/2018
C.FELL

0830 TAILGATE W/ DISCOVERY DRILLING

CHRISTOPHER FELL
DELEGATED
MARLOW SCOTT

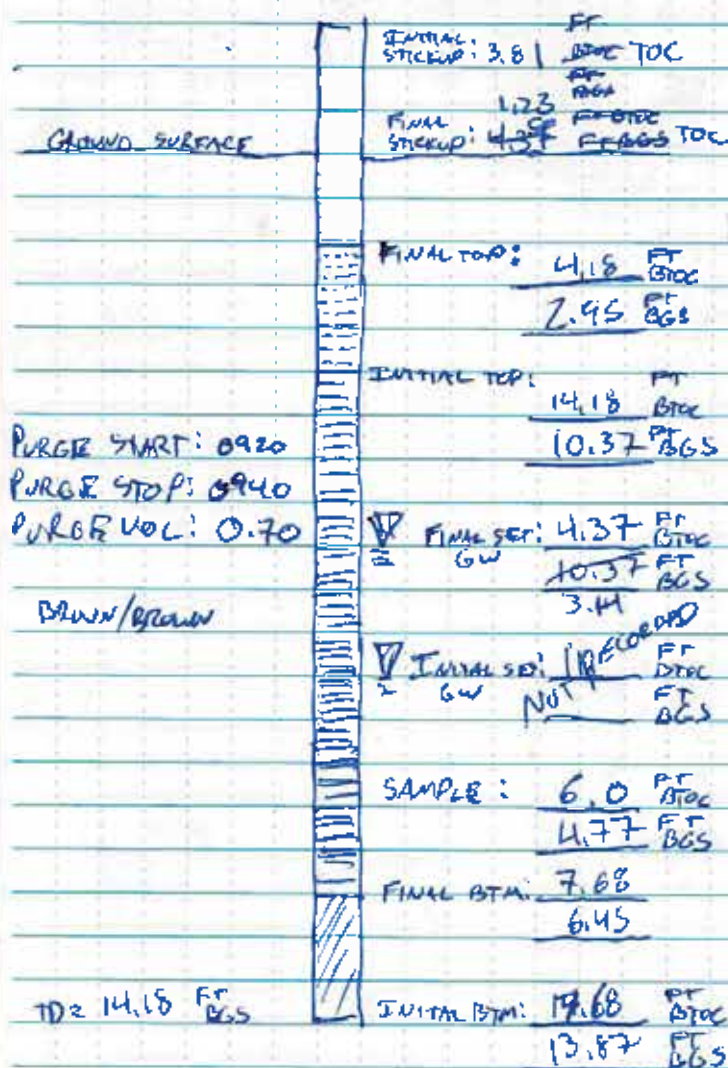
REM
DISCOVERY
DISCOVERY

REP
DRILLER
HELPER

WX: OVERCAST, 50s-60s F, 0-4 MPH

0830 SETTING UP ON TW125

TW125



0940 *SAMPLE GW*
FAT18-TW125-01
C.FELL
8/15/18
PFAS (EPA 537/MOD)
2 250ml HDPE
PLACED IN PRECHILLED COOLER

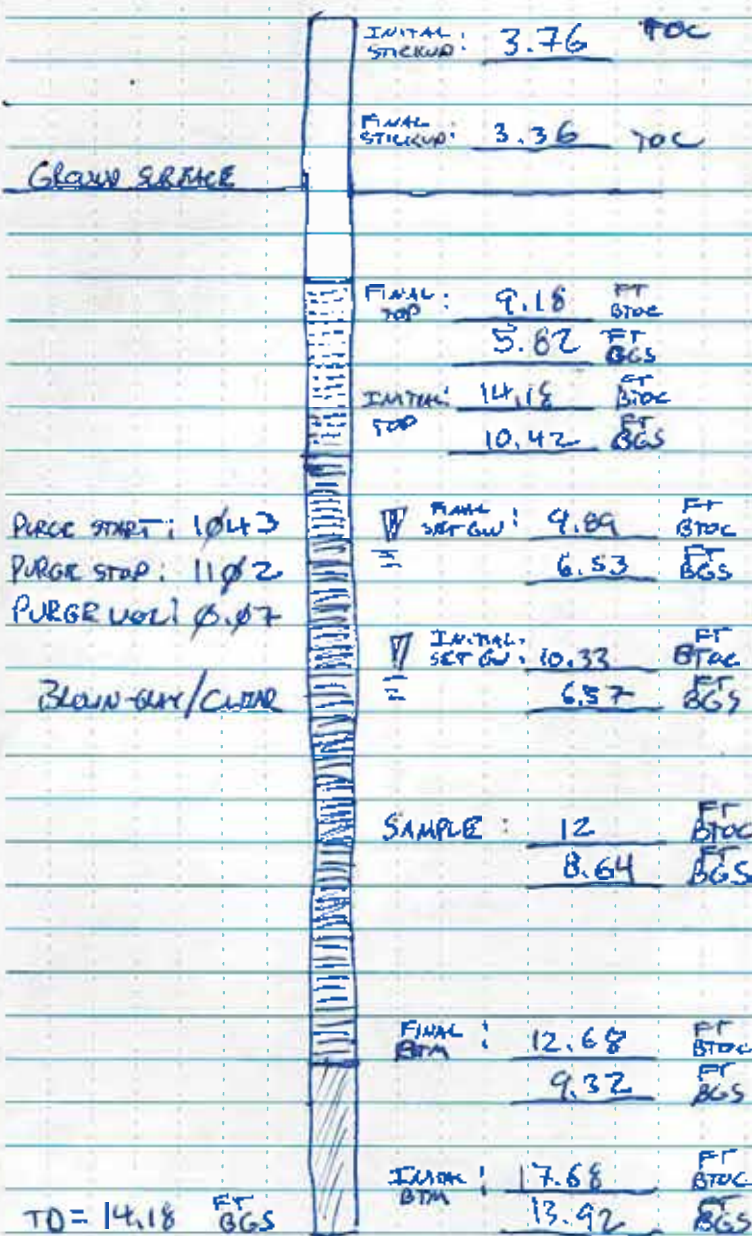
0842 OPENING SCREEN.

1000 CLEANING UP AT TW125, PRECIP WATER LEVEL INDICATOR

FAT PFAS
2393.03

8/15/18
C. FELL

1005 SETTING UP AT TW126a - MARCH SET TOWARDS ROAD TO ADD GAS



TW126a

1102 *GW SAMPLE*
FAT18-YUR26-01
C. FELL
8/15/18
PFAS (EPA SST MOD)
2 250ml HOPE
PLACED IN PSR CHILLED COOLER

- 1013 OPENING SCREEN
- 1031 SETTING FINAL DEPTHS - PULLING 1 ROD
- 1105 CRAWLING UP & DESIGN WATER LEVEL INDICATOR
- 1114 MOVING TO TW12L

Scale: 1 square = _____

(21)

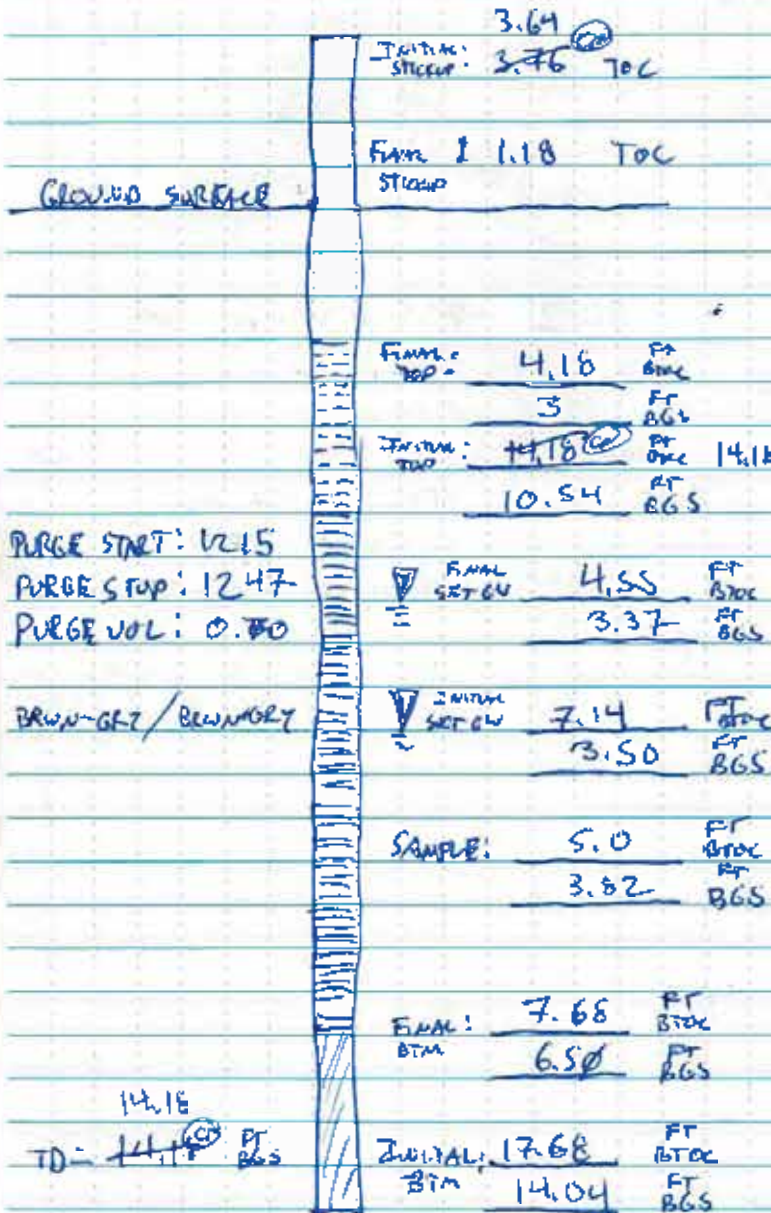
Rick on 2nd page

FAE PFAS
2393.03

8/15/18
C. FELL

1131 SETTING UP AT TW121

TW121



1247 * GW SAMPLE *
FAE 18-TW121-01
C. FELL
8/15/18
PFAS (EPA 537 MD)
2 250ml HOPE
PLACED IN PRECHILLED COOLER

1141 DEPLOY SCREEN

1212 PULLED 2 RODS (10 FT)

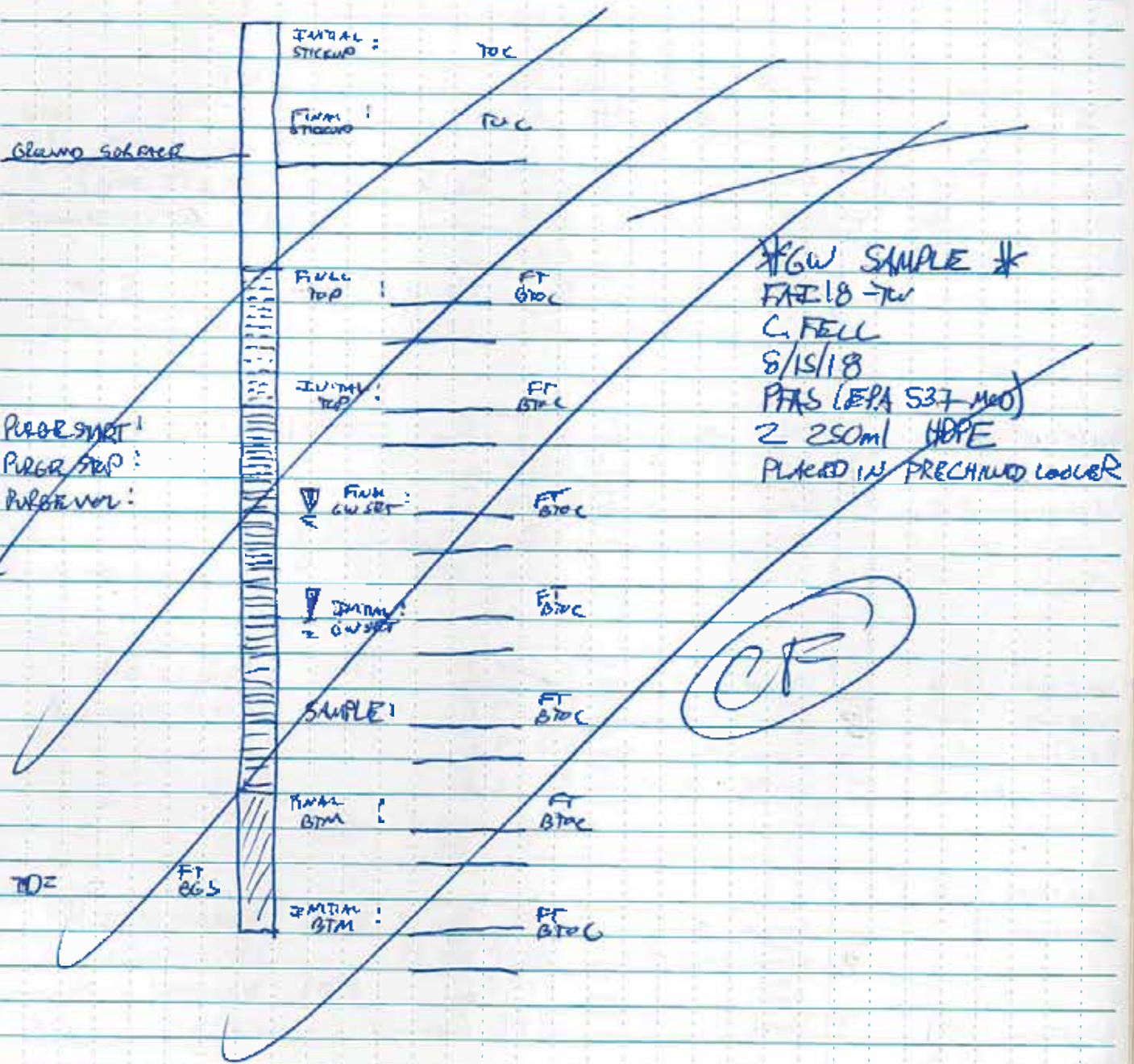
1253 CLEANING UP AT TW121 & DREW WATER LEVEL INDICATOR

1302 MOVE TO TW115a

FAR PTAS
2393.03

8/15/18
C.FELL

1315 SETTING UP AT TW 115



1325 STARTED ADV
SCREEN : 1
POD :

1351 OPENING SCREEN
1353 DRILL STRING BROKE OFF

Scale: 1 square = _____

FAT PFAS
2393.03

8/18/18
C. FELL

TW115a

STICKUP
(SEE BELOW)

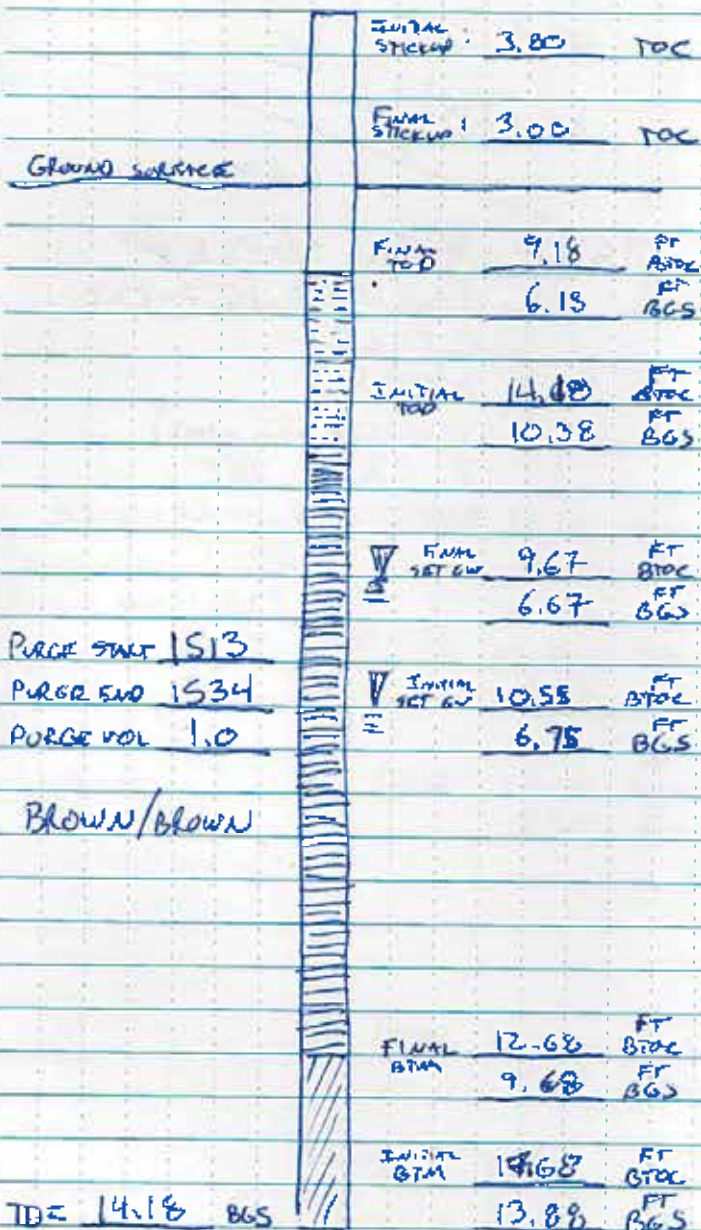
SCREEN DEPLOYED @ 1106 on 8/16/18	GW DEPTH: 4.66	FT BGS	FT BGS	SAMPLE INFO
	-0.82	3.84	STICKUP	2 250ml HDPE PFAS (EPA 537 MOD) PLACED IN PRE CHILLED COOLER
PURGE START 1438	STICKUP 0.62	FT BGS	FT BGS	1447 *SAMPLE 5* FAT18-TW115-05
PURGE END 1447	TOP SCREEN 4.18	FT BGS 3.36	FT BGS	
PURGE VOL 1.0	BTM SCREEN 7.68	FT BGS 6.86	FT BGS	
GRAY BROWN/CLEAR	SAMPLE 6.00	FT BGS 5.18	FT BGS	
PURGE START 1341	STICKUP 0.18	FT BGS	FT BGS	1401 *SAMPLE 4* FAT18-TW115-04
PURGE END 1401	TOP SCREEN 29.18	FT BGS 29.00	FT BGS	
PURGE VOL 0.7	BTM SCREEN 32.68	FT BGS 32.50	FT BGS	
GRAY-BROWN	SAMPLE 31.50	FT BGS 31.32	FT BGS	
PURGE START 1312	STICKUP 0.29	FT BGS	FT BGS	1328 *SAMPLE 3* FAT18-TW115-03
PURGE END 1328	TOP SCREEN 54.18	FT BGS 53.89	FT BGS	
PURGE VOL 0.7	BTM SCREEN 57.68	FT BGS 57.39	FT BGS	
GRAY-BROWN	SAMPLE 57.00	FT BGS 56.71	FT BGS	
PURGE START 1226	STICKUP 0.18	FT BGS	FT BGS	1240 *SAMPLE 2* FAT18-TW115-02
PURGE END 1240	TOP SCREEN 94.18	FT BGS 94.00	FT BGS	
PURGE VOL 0.7	BTM SCREEN 97.68	FT BGS 97.50	FT BGS	
PURGE START 1244	STICKUP 0.18	FT BGS	FT BGS	
PURGE END 1301	TOP SCREEN 94.18	FT BGS 94.00	FT BGS	
PURGE VOL 1.5	BTM SCREEN 97.68	FT BGS 97.50	FT BGS	
GRAY-BROWN	SAMPLE 95.00	FT BGS 94.82	FT BGS	
PURGE START 1138	11.21 FT BGS	18.67 FT BGS	SLOW RECOVERY	1202 *SAMPLE 1* FAT18-TW115-01
PURGE END 1202	STICKUP 4.46	FT BGS	FT BGS	
PURGE VOL 1.0	TOP SCREEN 119.18	FT BGS 114.72	FT BGS	
TD: 118.42	BTM SCREEN 122.68	FT BGS 118.22	FT BGS	
GRAY-BROWN	SAMPLE 122.60	FT BGS 118.14	FT BGS	(24)

Scale: 1 square =

FAD PFAS
2393.03

8/15/18
C.FELL

1410 MOVING ON TW11a



TW11a

1534 *GW SAMPLE*
FAD B - TW11 - 01
C.FELL
8/15/18
PFAS (EPA 537 MOD)
Z 250ml HDPE
PLACED IN PRE CHILLED COOLER

PURGE START 1513

PURGE END 1534

PURGE VOL 1.0

BROWN/BROWN

1435 SETTING UP AT TW11a

1443 DEPLOYING SCREEN

1511 CLEANING UP AT TW11a, DECON WATER LEVEL INDICATOR

1549 MOVING TO TW127

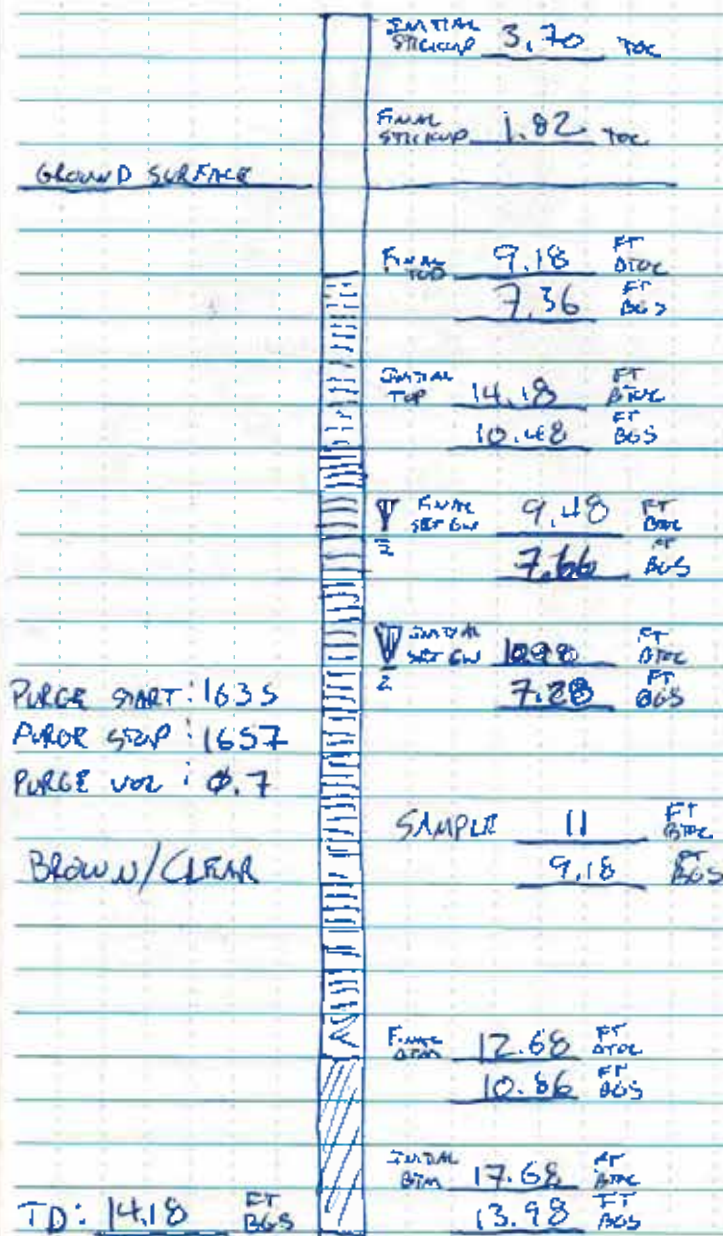
Scale: 1 square = _____

FAI PRAS
2393.03

8/15/18
C. FELL

1557 BEGAN ADVANCING TW127

TW127



1657 *6W SAMPLE*
 FAI18-TW127-01
 C. FELL
 8/15/18
 PRAS (EPA 537 MOD)
 2 250ml HOPE
 PLACED IN PRE-CHILLED COOLER.

PURGE START: 1635
 PURGE STOP: 1657
 PURGE VOL: 1.7

BROWN/CLEAR

1602 DEPLOYING SPIG SCREEN

1701 CLEANING UP AT TW127, DECON WATER LEVEL INDICATOR

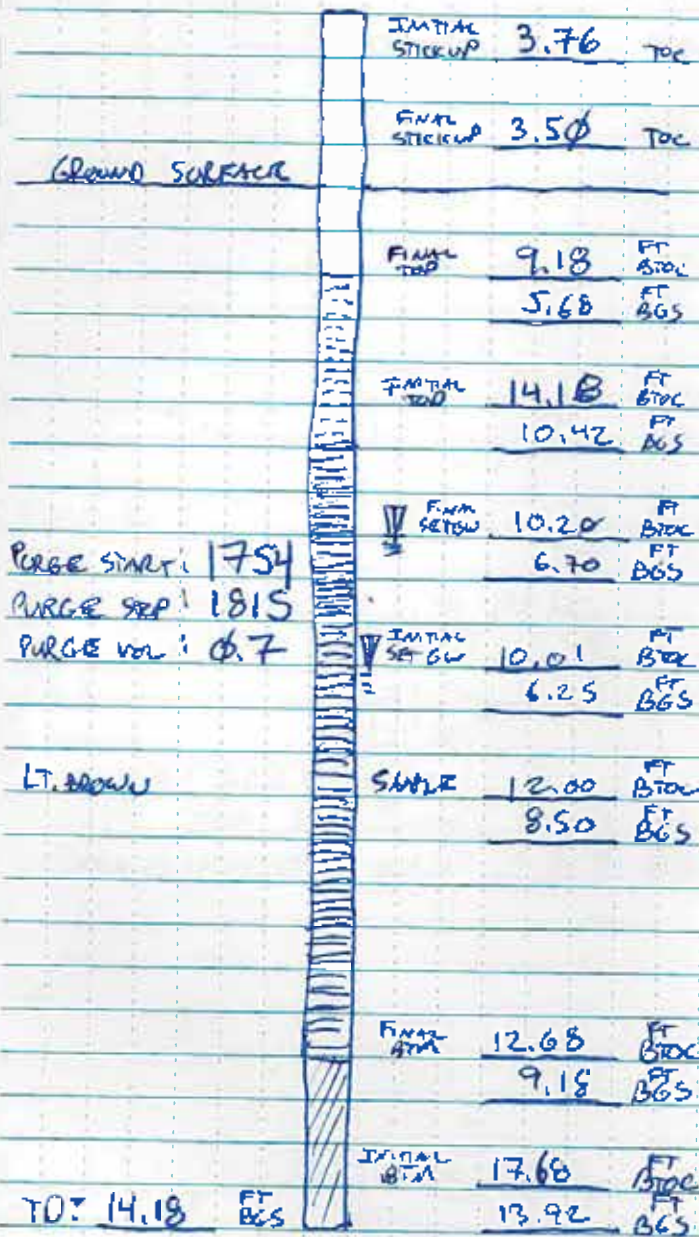
1710 MOVING TO TW1170

FAP PFAS
2393.03

8/15/18
C. FELL

1715 SETTING UP AT TW117a

TW117a



1815 *GW SAMPLE
~~FAP18 TW117-01~~
 FAP18-TW117-01
 C. FELL
 8/15/18
 PFAS (BPA-S37 MUD)
 2 250ml HOPE
 PLACED IN ARCHIVED CONTAINER

1722 DEPLOYED SCREEN

1741 REMOVED 1 ROD (SPT)

1819 CLEANING UP AT TW117a, DECON WATER LEVEL INDICATOR, LEFT TW117, DUMPED DECON WATER IN DRUM AT FTA AREA

Scale: 1 square =

FAI PFAS
2393-03

X

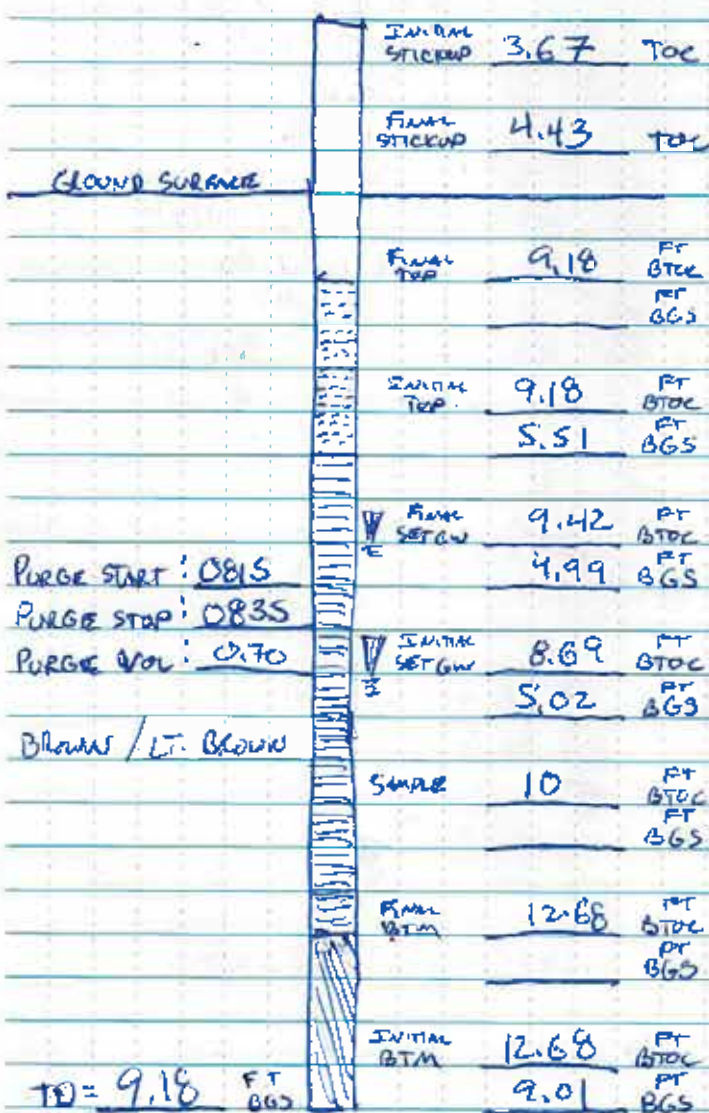
8/16/18
C. FELL

0730 TAILGATE MEETING w/ DISCOVERY DRILLING

• CHRISTOPHER FELL	R&M	QEP
• DEREK DELL	DISCOVERY	DRILLER
• MARLOW SCOTT	DISCOVERY	HELPER

WX: OVERCAST, 50s F, CALM

0740 SETTING UP ON TW119



TW119

0835 *GW SAMPLE*
FAI18-TW119-01
C. FELL
8/16/18
PFAS (EPA 537 ADD)
2 250ml HDPE
PLACED IN PRECHILLED COOLER

PURGE START: 0815
PURGE STOP: 0835
PURGE VOL: 0.70

BROWN / LT. BROWN

TD = 9.18 FT BGS

0745 DEPLOYING SCREEN

0845 CLEANING UP, DECON WATER LEAK INDICATOR, MOVING TO TW128a

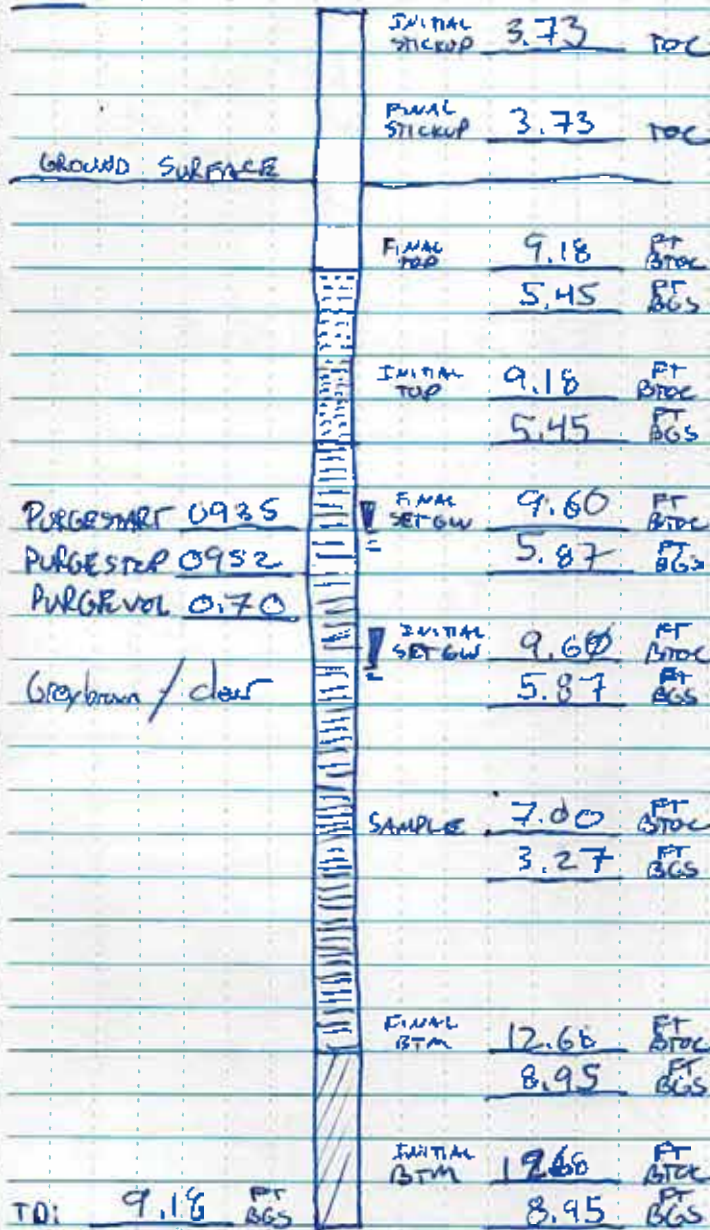
Scale: 1 square = _____

(28)

FAT PFAS
2393.03

8/16/18
C.FELL

0856 SETTING UP ON TW128a



TW128a

0952 *GW SAMPLE*

FAT18-TW128-01
C.FELL
8/16/18
PFAS (EPA 537 MOD)
2 250ml HDPE
PLACED IN PRE CHILLED COOLER

0915 *RINSE SAMPLE*

FAT18-WA-RS01
C.FELL
8/16/18
PFAS (EPA 537 MOD)
2 250ml HDPE
PLACED IN PRE CHILLED COOLER

0905 DEPLOYING SCREEN

1000 CLEANING UP AT TW128a, DECON WATER LEVEL INDICATOR, MOVING TO TW115

1046 MR. MANNEN CALLED AND LET US KNOW THAT WE COULD PULL TODAY

1055 ADVANCING TW115a, SEE PAGE 24 FOR NOTES

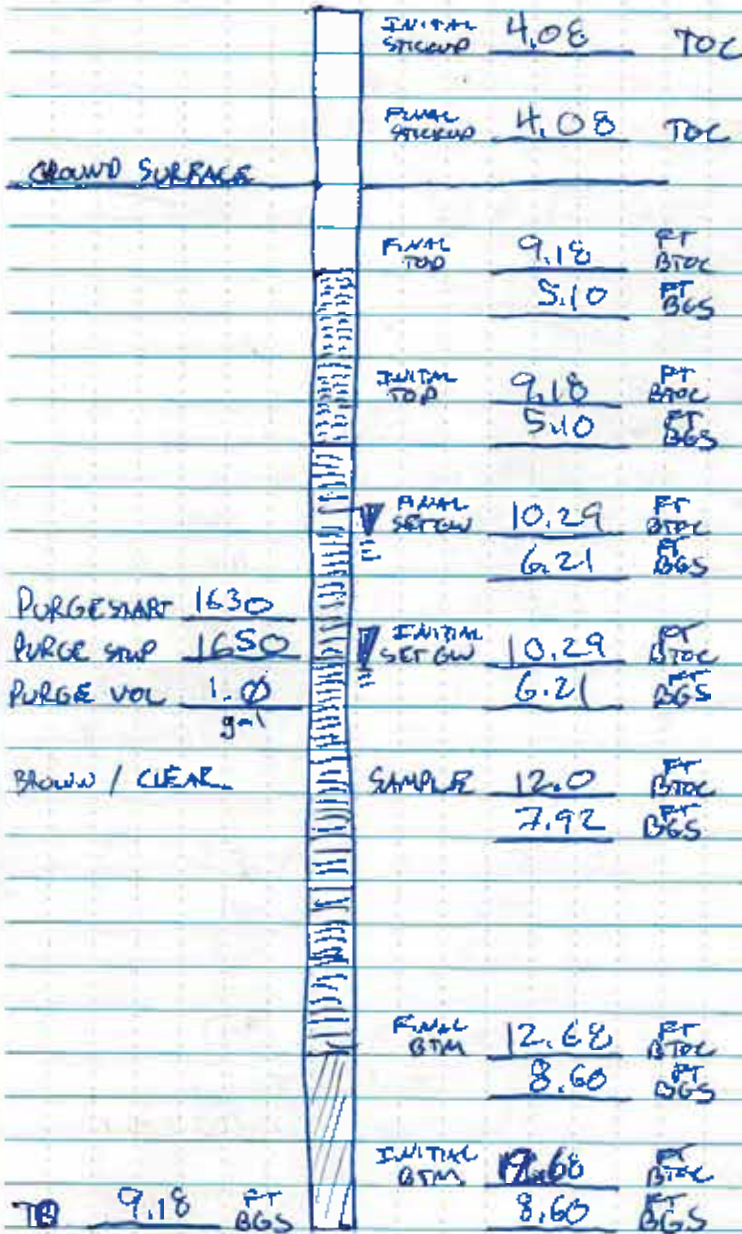
1451 CLEANING UP AT TW115a, DECON WATER LEVEL INDICATOR

Scale: 1 square = _____

FAI DFAS
2393.03

8/16/18
C.FELL

1453 MOVE TO TW129a, DECON WATER/PURGE H₂O ADDED TO PREVENT FROST
1550 SETTING UP ON TW129a



TW129a

1650 *GW SAMPLE*
FAI 18-TW129-01
C.FELL
8/16/18
DFAS (ERR 537 MOD)
2 250ml HDPE
PLACED IN REFRIGERATED COOLER.

1600 DEPLOYING SCREEN
1656 CLEANING UP AT TW129a, DECON WATER LEVEL INDICATED
1710 MOVE TO TW116

Scale: 1 square = _____

FAC PFAS
2393.03

8/16/18
C.FELL

1718 SETTING UP AT TW 116

TW 116

GROUND SURFACE

INITIAL
STICKUP 1.80 TOC

FINAL
STICKUP 2.80 TOC

FINAL
TOP 4.18 FT
BTOC

1.38 FT
BGS

1820 *GW SAMPLE #

FAC18-TW116-01

C.FELL

8/16/18

PFAS (EPA 537 MOD)

2.250ml HDPE

PLACED IN PRECHILLED COOLER

INITIAL
TOP 4.18 FT
BTOC

2.38 FT
BGS

FINAL
SETDOWN 4.90 FT
BTOC

2.10 FT
BGS

PURGE START 1756

PURGE STOP 1820

PURGE VOL 0.8

INITIAL
SETDOWN 4.00 FT
BTOC

2.20 FT
BGS

LIGHT BROWN / LIGHT BROWN

SAMPLE 6.50 FT
BTOC

3.70 FT
BGS

FINAL
BTM 7.68 FT
BTOC

4.88 FT
BGS

INITIAL
BTM 7.68 FT
BTOC


5.88 FT
BGS

TD = 4.18 FT
BGS

1726 DEPLOYED SCREEN

1830 CLEANING UP AT TW 116, DECON WATER LEVEL INDICATOR

1835 C.FELL OPPOSITE, DISCOVERY OPPOSITE

 CHRISTOPHER D. BELL
8/16/18

Scale: 1 square = _____

(31)

Plot in 100 Run

FAI PFAS
2393.03

8/17/18
C. FELL

0811 SAFETY TAILGATE
↳ CHRISTOPHER FELL RHM OED
↳ DELEK PELL DISCOVERY DIVER
↳ MARLOW SCOTT DISCOVERY HELPER

WX: OVERCAST, SCF, 0-5 MPH

0815 SETTING UP AT TW118a

0.0 ppm P10 BREATHING ZONE	INITIAL STICKUP	4.16	TOP
	FINAL STICKUP	0.28	TOP
GROUND SURFACE			
	FINAL TOP	4.18	FT BTDC
		3.90	FT BGS
	INITIAL TOP	9.18	FT BTDC
		5.02	FT BGS
		5.22	
	FINAL SET GW	4.94	FT BTDC
		4.94	FT BGS
RIDGE START: 0911			
RIDGE STOP: 0928			
RIDGE VOL: 1.00			
	INITIAL SET GW	9.17	FT BTDC
		5.01	FT BGS
COLOR BROWN / CLEAR	SAMPLE	6.5	FT BTDC
		6.22	FT BGS
	FINAL BTM	7.68	FT BTDC
		7.40	FT BGS
	INITIAL BTM	12.68	FT BTDC
TD: 9.18		8.92	FT BGS

TW118a

0928 *GW SAMPLE*
FAI8-TW118-01
C. FELL
8/17/18
PFAS (EPA 537 MOD)
2 250 ml HOPK
PLACED IN REFRIGERATED CONTAINER

0840 DEPLOY SCREEN

0936 CLEANING UP AT TW118a, DECON WATER LEVEL & TOOLING

Scale: 1 square = _____

(32)

FAI PFAS
2393.03

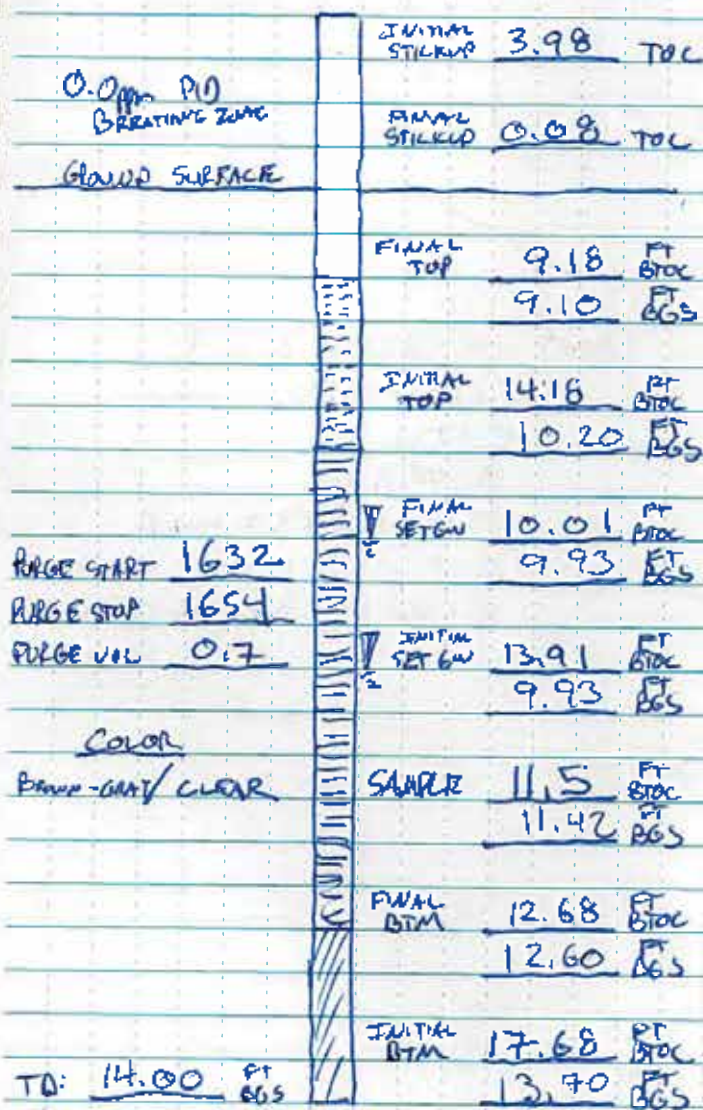
8/17/18
C.FELL

1520 MOVING TO TW110a AFTER GOING TO ALASKA AIR CARGO

1556 SETTING UP ON TW110a

1602 DEPLOYING SCREEN ON TW110a

1658 CLEANING UP AT TW110a, DECON WATER LEVEL INDICATOR



TW110a

1654 *GW SAMPLE*
FAI18-TW110-01
C.FELL
8/17/18
PFAS (EPA 537 MOD)
2 250ML - HOPPS
PLACED IN RECHILLED COOLER

RARGE START 1632
RARGE STOP 1654
RARGE VOL 0.7

COLOR
BROWN-GRAY/CLEAR

1705 MOVING TO TW108a

FAI PFAS
2393.03

8/17/18
C.FELL

1709 SETTING UP AT TW108a

1713 DEPLOYED SCREEN

1805 CLEANING UP AT TW108a, DECON

1809 MOVING TO TW109

0.0 PPM P10 BREMNER 2000	INITIAL STICKUP	4.01 14.01 TOC
GROUND SURFACE	FINAL STICKUP	4.01 TOC
	FINAL TOP	14.18 FT 10.17 BGS
	INITIAL TOP	14.18 FT 10.17 BGS
PURGE START 1743	FINAL GW SET	14.54 FT 10.53 BGS
PURGE STOP 1759	INITIAL SETUP	14.54 FT 10.53 BGS
PURGE VOL 0.7	SAMPLE	16.0 FT 11.99 BGS
COLOR BROWN / CLEAR	FINAL BTM	17.68 FT 13.67 BGS
FDI 13.90 FT BGS	INITIAL BTM	17.68 FT 13.67 BGS

TW 108a

1800 *SAMPLE GW*
FAI18-TW108-01
C.FELL
8/17/18
PFAS (ERA 587 M09)
2 250 ml HDPE
PLACED W PRECILL EPOXIDES

FAI PFAS
2393.03

8/17/18
C.FELL

1810 SETTING UP AT TW109

1820 DEPLOYED SCREEN

1913 CLEANING UP AT TW109
↳ DECON

0.0 ppm PIP
BREATHING ZONE

GROUND SURFACE

TW109

INITIAL SET UP	3.92	TOP
FINAL SET UP	3.92	TOP
FINAL TOP	14.18	FT BTM
	10.26	FT BGS
INITIAL TOP	14.18	FT BTM
	10.26	FT BGS
FINAL GWS	14.42	FT BTM
	10.50	FT BGS
INITIAL SET GW	14.42	FT BTM
	10.50	FT BGS
SAMPLE	16.0	FT BTM
	12.08	FT BGS
FINAL BTM	17.68	FT BTM
	13.76	FT BGS
INITIAL BTM	17.68	FT BTM
	13.76	FT BGS
TO: 13.90	FT BGS	

PURGE START 1850
PURGE STOP 1909
PURGE VOL 1.0

COLOR
BROWN / CLEAR

1909 # GW SAMPLE #
FAI18-TW109-01
C.FELL
8/17/18
PFAS (EPA 537 MOD)
2 250ml HDPE
PLACED IN FRIECHILLER cooler

Scale: 1 square = _____

35

Return to Room

FAZ PFAS
2393.03

8/17/18
C. FELL

TW101

		0.0 PM AD BREATHING ZONE		COMMON SAMPLE RULES 2 250ml HDPE (FAM) PFAS (EPA 537 MOD) PLACE IN W PRE CHILLED COOLER		
PROG START	1433	GW	10.08	FT	7.29 BGS	1452 *SAMPLE 5*
PROG STOP	1449	STICKUP	2.79	TOP	— BGS	FAZ18-TW101-05
PROG VOL	1.0	TOP SCREEN	9.16	BTM	6.39 BGS	
COLOR	GRAY/CLEAR	BTM SCREEN	12.68	BTM	9.89 BGS	1453 *SAMPLE 7 (DUPLICATE)*
		SAMPLE	11.50	BTM	8.71 BGS	FAZ18-TW101-07
PROG START	1358	GW	7.98	FT	7.78 5.19 ^{one} BGS	1418 *SAMPLE 4*
PROG STOP	1418	STICKUP	0.20	TOP	— BGS	FAZ18-TW101-04
PROG VOL	1.0	TOP SCREEN	19.18	BTM	16.98 BGS	
COLOR	BROWN/BROWN	BTM SCREEN	22.68	BTM	22.48 BGS	
		SAMPLE	21.50	BTM	21.30 BGS	
PROG START	1319	GW	7.75	FT	9.35 BGS	1343 *SAMPLE 3*
PROG STOP	1342	STICKUP	0.40	TOP	— BGS	FAZ18-TW101-03
PROG VOL	1.0	TOP SCREEN	44.18	BTM	43.78 BGS	
COLOR	GRAY/LT GRAY	BTM SCREEN	47.68	BTM	47.28 BGS	
		SAMPLE	46.50	BTM	46.10 BGS	
PROG START	1246	GW	15.00	FT	14.84 BGS	1306 *SAMPLER 2*
PROG STOP	1306	STICKUP	0.16	TOP	— BGS	FAZ18-TW101-02
PROG VOL	0.70	TOP SCREEN	84.18	BTM	84.02 BGS	
COLOR	GRAY/Lt Gray	BTM SCREEN	87.68	BTM	87.52 BGS	
		SAMPLE	86.50	BTM	86.34 BGS	
PROG START	1143	GW	19.98	FT	19.63 BGS	1156 *SAMPLE 1*
PROG STOP	1156	STICKUP	0.35	TOP	— BGS	FAZ18-TW101-01
PROG VOL	0.7	TOP SCREEN	124.18	BTM	123.83 BGS	
COLOR	GRAY/gray-brown	BTM SCREEN	127.68	BTM	127.33 BGS	1231 *SAMPLE 6 (REPLATE)*
TO	126.9 FT BGS	SAMPLE	126.5	BTM	126.15 BGS	FAZ18-TW101-06

Scale: 1 square =

(2A)

FAI PFAS
2393.03

8/17/18
C.FELL

1030 SETTING UP AND ADVANCING TW101

SCREEN 1

RISER :  129.18 FT TOTAL

1059 DEPLOYING SCREEN

1320 ADVANCING TH102

~~*SAMPLE*~~

1330 FAI18-TH102-01 (PRIMARY)

1331 FAI18-TH102-02 (DUPLICATE)

C.FELL

8/17/18

PFAS (EPA 537 MOD)

2 4oz HDPE

PLACED IN PRECHILLED COOLER

170 1/2
FT
BGS

1332

~~*SAMPLE*~~

FAI18-TH102-03

C.FELL

8/17/18

PFAS (EPA 537 MOD)

1 1oz HDPE

PLACED IN PRECHILLED COOLER

4-5 FT
BGS

1510

~~*SAMPLE*~~

FAI18-WA-RS02

C.FELL

8/17/18

PFAS (EPA 537 MOD)

2 250ml HDPE

RINGSIDE

1511

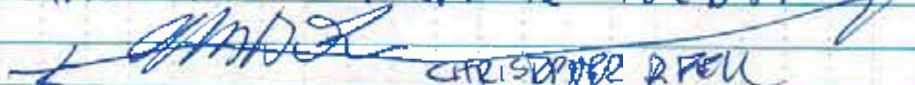
CLEAN UP AND DECON WATER LEVEL INDICATOR,

4 PRORATED DECON WATER PLACED IN DRUM AT

PTA.

1930

C.FELL & DISCOVERY OPPOSITE FOR DAY



CHRISTOPHER R. FELL

(37)

FAR PFAS
239B.01

X

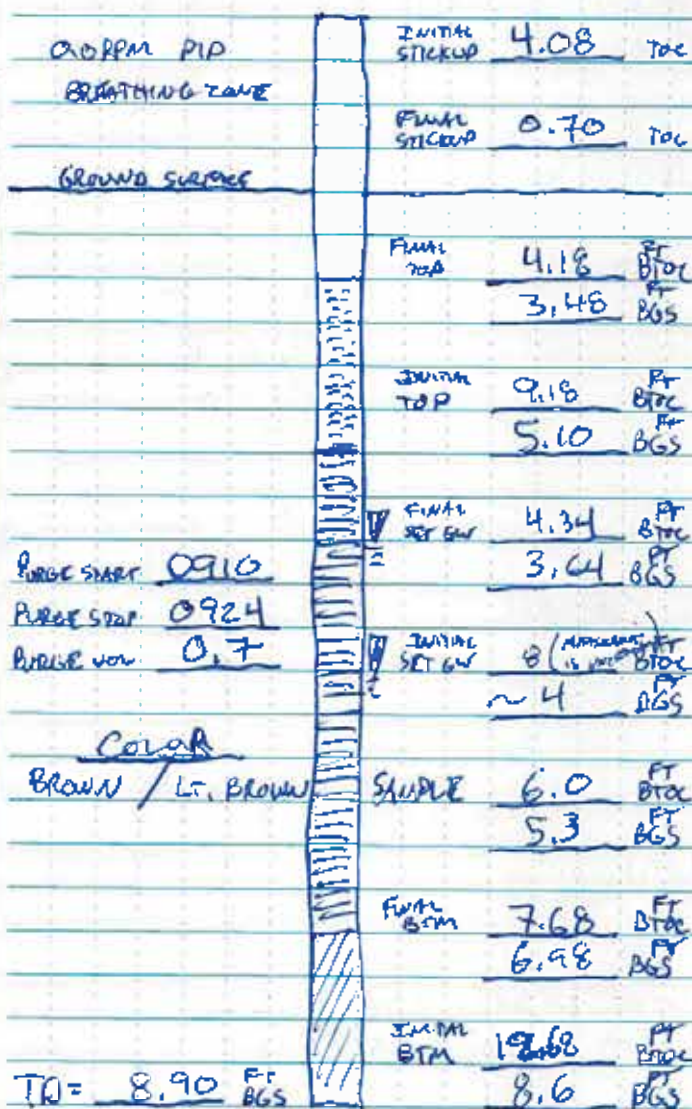
8/18/18
C. FELL

0800 SAFETY TAILGATE W/ DISCOVERY DRILLING

• CHRISTOPHER FELL	REM	QEP
• DEREK DELL	DISCOVERY	DRILLER
• MARLOW SCOTT	DISCOVERY	HELPER

0820 TRANSFERRED DECON/PURGE WATER TO DRUMS STORED AT THE FTA

0826 SETTING UP AT TW106



TW106

0924 #GW SAMPLE #
FA18-TW106-01
C. FELL
8/18/18
PFAS (EPA 537 MOD)
2 250ml HDPE
PLACED IN PRECHILLED COOLER

0834 DERAILING SCREEN

FAI PFAS
2393.01

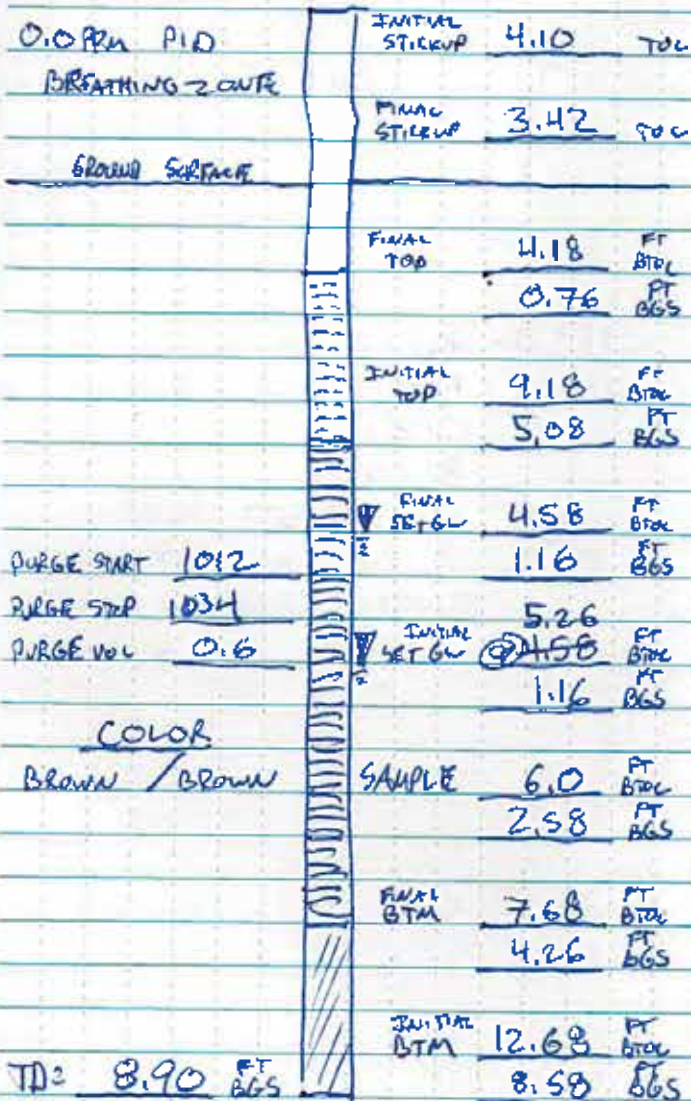
8/18/18
C.FELL

0927 CLEANING UP AT TW106, DECON

0933 MOVING TO TW104

0936 SETTING UP AT TW104

0939 ADVANCING TW104



TW104

1034 *GW SAMPLE*
FAI18-TW104-01
C.FELL
8/18/18
PFAS (ERA 537 MOD)
2 250 ml HDPE
PLACED IN PRECHILLED COOLER

1055 *RW SAMPLE*
FAI18-PWA-RS03
C.FELL
8/18/18
PFAS (ERA 537 MOD)
2 250 ml HDPE
PLACED IN PRECHILLED COOLER

0942 DEPLOYED SCREEN

1036 CLEANING UP AT TW104, DECON

Scale: 1 square = _____

FAD PFA5
2393.03

8 h/kg
C.FELL

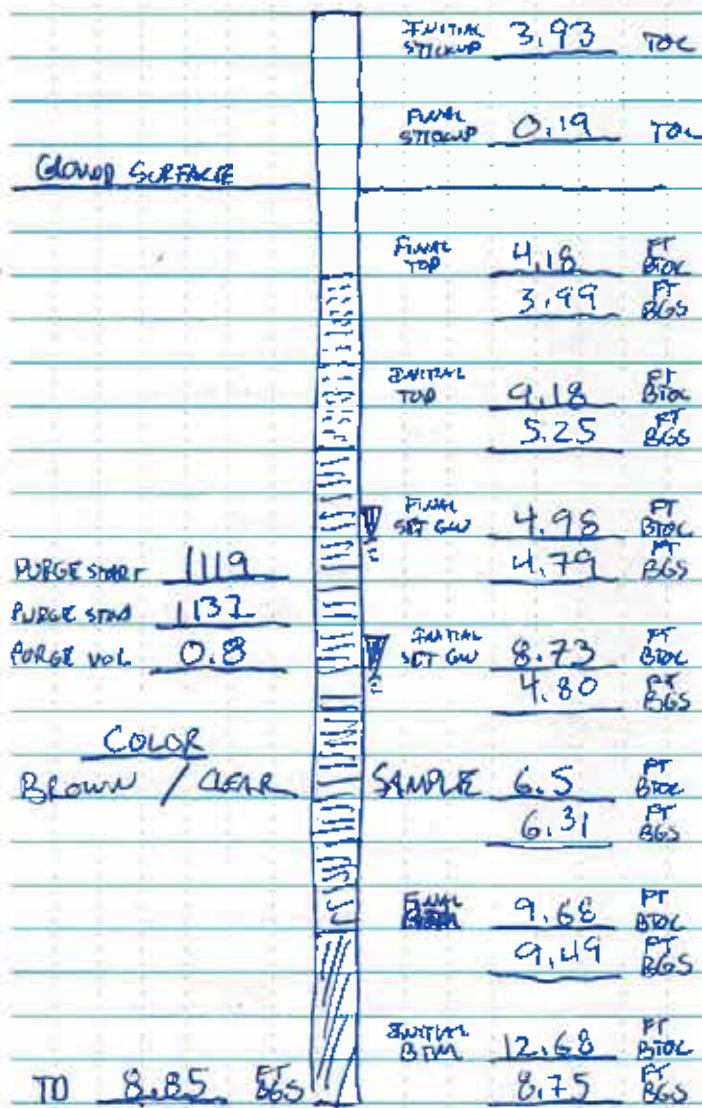
1040 MOVING TO TW102a

1044 SETTING UP AT TW102a

1047 ADVANCING TW102a

1049 DEPLOYED SCREEN

TW102a



1137 *GW SAMPLE *

FAD 18-TW102-01

C.FELL

8/18/18

PFA5 (EPA537 MOD)

2 250 ML HOPPE

PLACED IN REFRIGERATED COOLER

1140 CLEANING UP AT TW102, DEON

FAI PFAS
2393.03

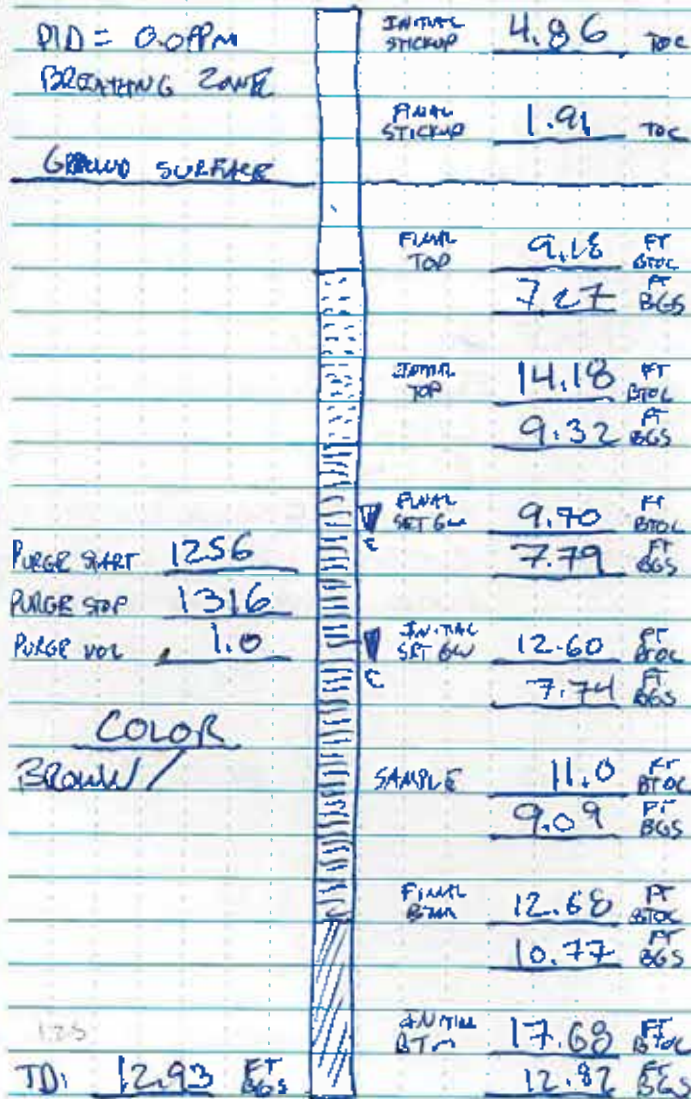
8/18/18
C.FELL

1148 MOVING TO TW130 / TH103

1200 SETTING UP ON TW130

1213 DEPLOYED SCREEN

1327 CLEANING UP AT TW130 / TH103, PATCHED ASPHALT W/
CONCRETE



TW130

GW SAMPLE

1316 FAI18-TW130-01 (PRIMARY)
1317 FAI18-TW130-02 (DUP)
C.FELL
8/18/18
PFAS (EPA 537 MOD)
4 250ml HDPE

1244 *SOIL SAMPLE*
FAI18-TH103-01
C.FELL
8/18/18
PFAS (EPA 537 MOD)
1 4oz HDPE

1246 *SOIL SAMPLE*
FAI18-TH103-02
C.FELL
8/18/18
PFAS (EPA 537 MOD)
1 4oz HDPE
ALL PACKED IN PRE-CHECKED CONTAINER

FAI PFAS
2393.03

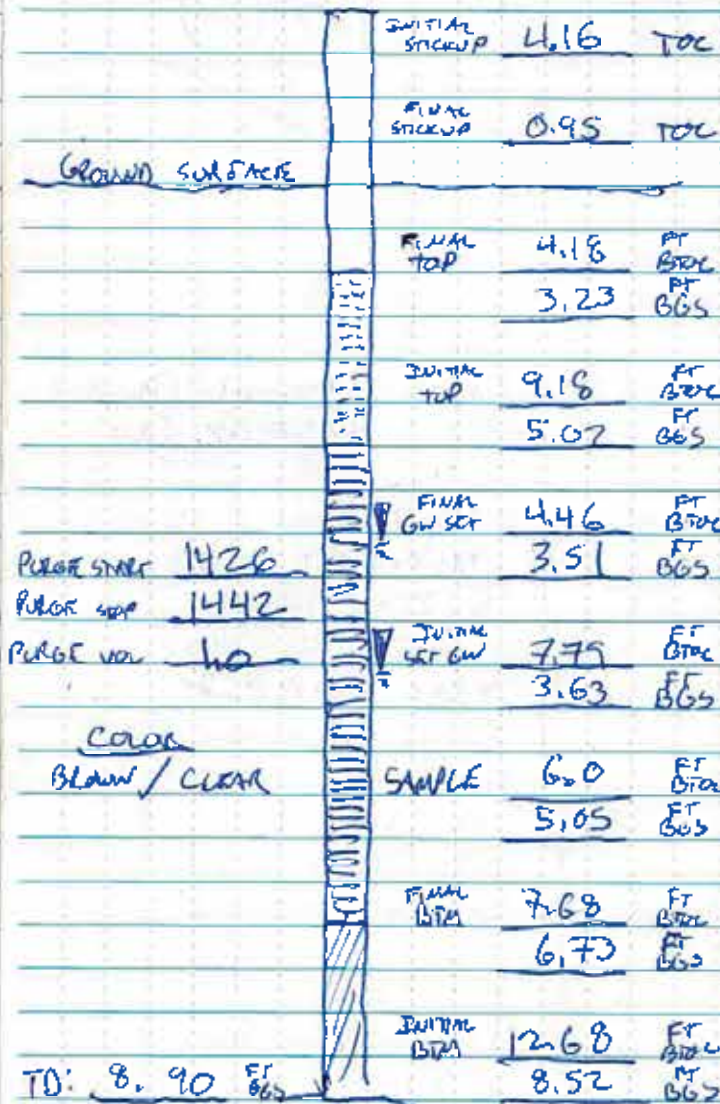
8/18/18
C.FELL

1345 MOUNG TO TW105

1350 SETTING UP AT TW105

1356 DEPLOYED SCREEN

1448 CLEANING UP AT TW105, PECOM



TW105

1442 *GW SAMPLE*

FAI18 = TW105 - 01

C.FELL

8/18/18

PFAS (EPA 537 MOD)

2 250ml HOPE

PLACED W PRECHILLED COOLER

FAI PFAS
2392.03

8/18/18
C.FELL

- 1453 MOVING TO TW107
- 1459 SETTING UP AT TW107
- 1506 DEPLOYED SCREEN
- 1556 CLEANING UP, DECON, ADDING DEION/PURGE WATER TO DRUMS AT FTA.

~~TW107~~

PID: 0.0 PPM BREATHING ZONE	INITIAL SETUP	4.03	TOC
CLOUD SURFACE	FINAL SETUP	0.56	TOC
	FINAL TOP	4.19	FT BTOL
		3.62	FT BGS
	INITIAL TOP	9.18	FT BTOL
		5.15	FT BGS
	FINAL SETUP	4.57	FT BTOL
PURGE CONT 1536		4.01	FT BGS
PURGE STOP 1552	INITIAL SETUP	8.02	FT BTOL
PURGE VOL 1.0		3.99	FT BGS
COLOR BLOW / CLEAR	SAMPLE	6.0	FT BTOL
		5.44	FT BGS
	FINAL BTM	7.68	FT BTOL
		7.12	FT BGS
TA: 8.80	INITIAL BTM	12.68	FT BTOL
		3.65	FT BGS

1552 *GW SAMPLE*

FAI 18-TW107-01

C.FELL

8/18/18

PFAS (EPA 537 MOD)

2 250ml HDDE

PLACED IN PRC (FELL) COOLER

1630 C.FELL & DISCOVERY OFF SITE

[Signature]

CHRISTOPHER D. PARR
8/18/18

Scale: 1 square =

43

Return in Rain

FAI PFAS
2393.03

X

10/4/18
C. FELL

0740 SAFETY TAILGATE W/ DISCOVERY DRIVING

CHRISTOPHER FELL
SCOTT BOMBARD

R&M
DISCOVERY

QEP
DRILLER

WX: 37°F, MOSTLY CLEAR, CALM

DISCUSSED PROJECT ✓

AIRFIELD BAGGING

TTT PICKUP ✓

TW123a (10 am)

TW302a (9 am)

0900 MEET W/ GVEA @ TW302a → NC

0910 MEET W/ GVEA @ TW123a → NC

0930 AIRPORT BAGGING FOR VEHICLE PASSES & GATE CLICKERS

0952 SETTING UP AT TW123a

1008 ^{CP}

SCREEN SECTION IS 4.18 FT
RISEES ARE 5.0 FT

Christopher D. Fell
10/4/18

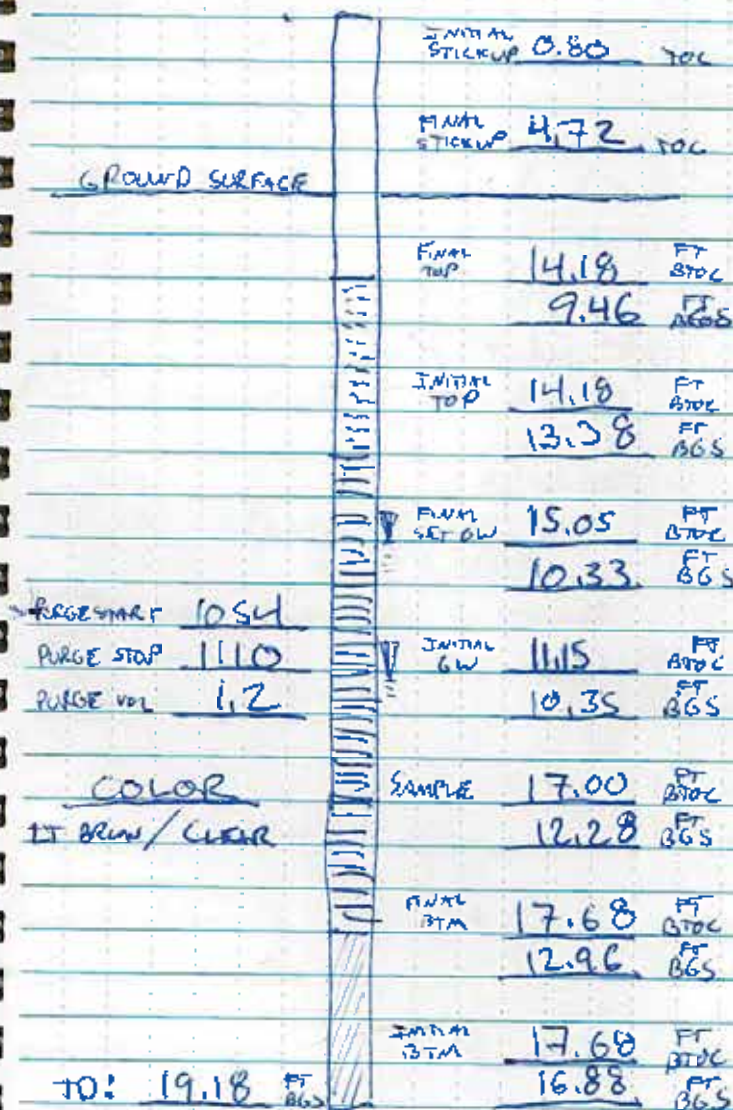
FAI PFAS
2393.03

10/4/18
C. FELL

1008 START DRILLING TW123a

1015 DEPLOYING SCREEN

1119 CLEANING UP AT TW123a, DEGW WATER LEVEL INDICATOR



TW123a

1110 *SAMPLE*
FAI B - TW123-01
C. FELL
10/4/18
PFAS (EPA 537 MD) Z 250ML HDPE
PLACED IN PRE CHILLED COOLER

RESUME 1054
PURGE STOP 1110
PURGE VOL 1.2

COLOR
LT BRN / CLR

20FT TUBING

-1 ROD

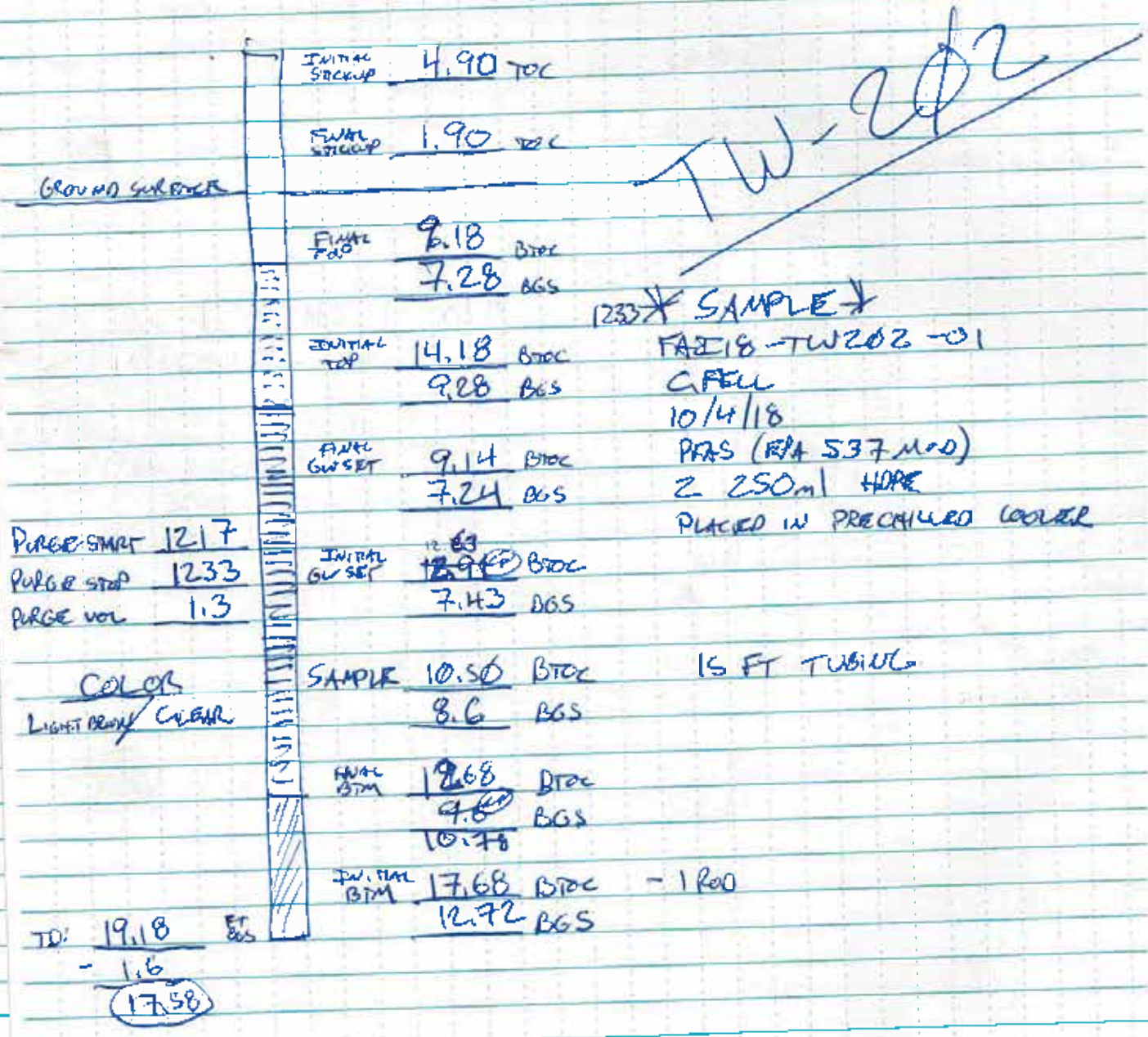
TO: 19.18 FT BGS
- 1.50
17.68

Scale: 1 square =

10/4/18
C.FELL

FAI PFAS
2393.03

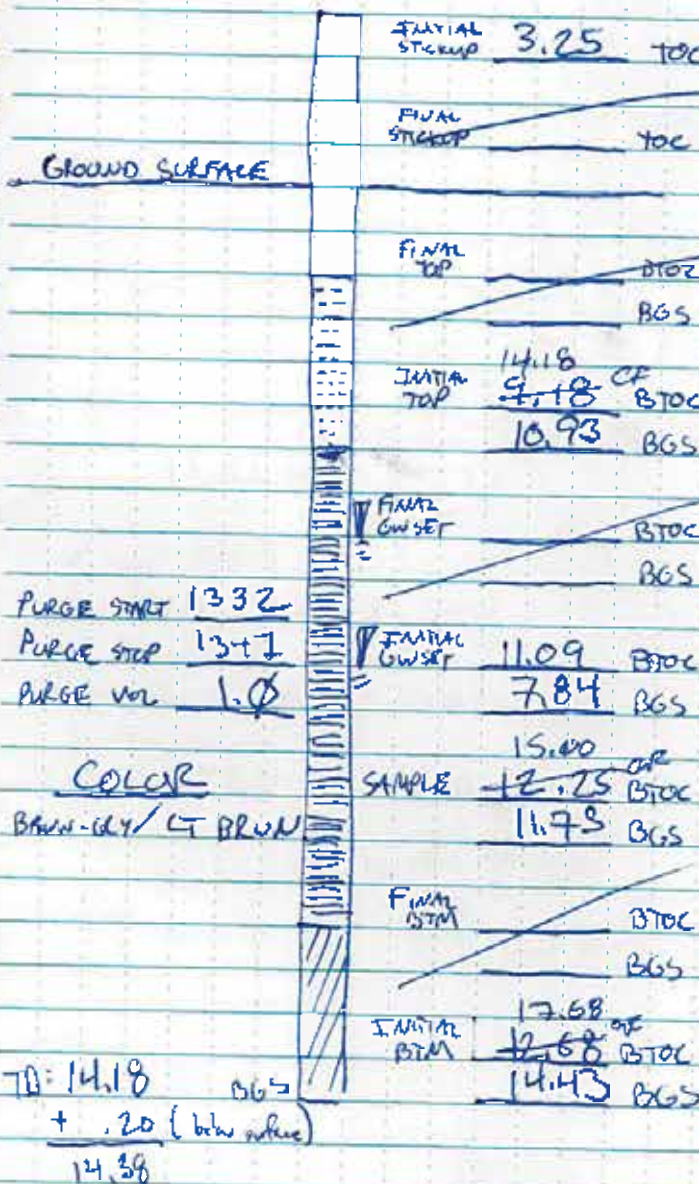
- 1130 SETTING UP AT TW202
- 1135 ADVANCING TW202
- 1147 DEPLOYED SCREEN ON TW202
- 1238 CLEAN UP AT TW202, DECON WATER LEVEL INDICATOR



FAI PFAS
2393.03

10/4/18
C. FELL

- 1245 MOVING TO TW 210a
- 1248 SETTING UP AT TW 210a
- 1302 DEPLOYED SCREEN AT TW 210a
- 1355 CLEANING UP AT TW 210a, DECON WATER LEVEL INDICATOR



TW 210a

1347 *SAMPLE*
FAI 15-TW 210-01
C. FELL
10/4/18
PFAS (EPA 537 MOD)
2 250 ml HDPE
PLACED IN PRECHILLED COOLER

20 FT TUBING

FAI PRAS
2393.03

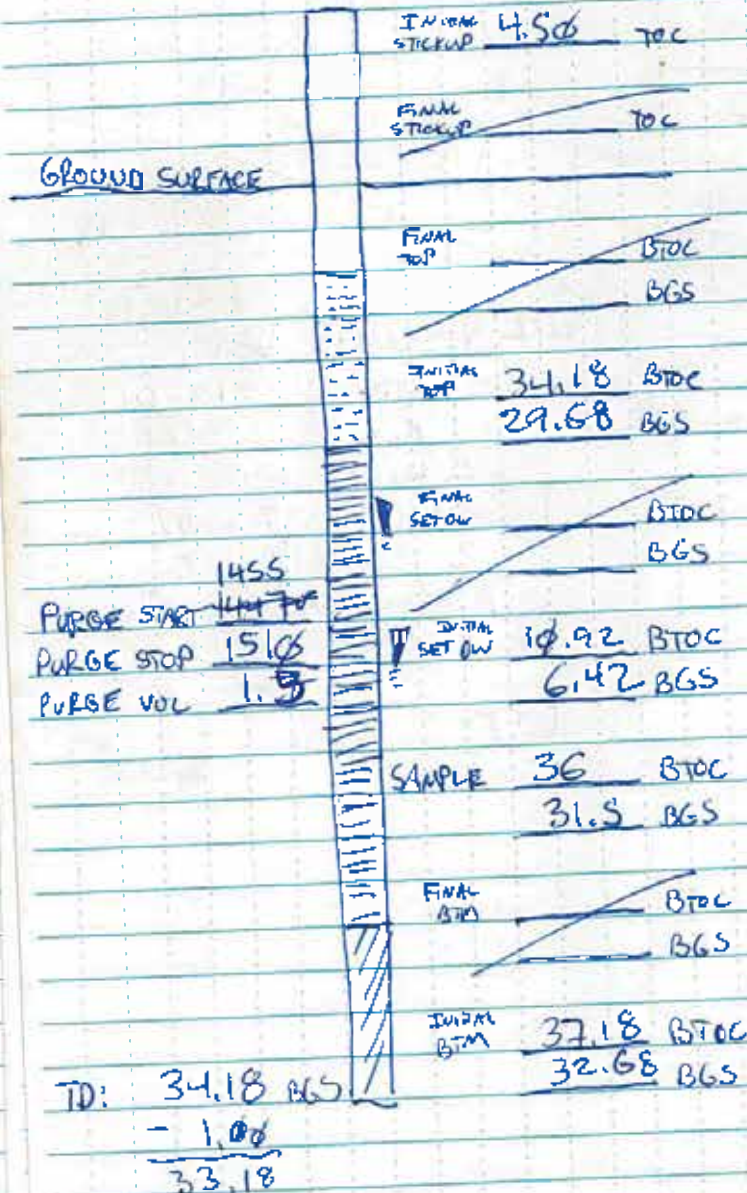
10/4/18
C.FELL

1402 MOVING TO TW211 → ≈ 25 FT BELOW GW TARGET

1410 SETTING UP AT TW211

1425 DEPLOYED SCREEN FOR TW211

1517 CLEANING UP AT TW211



TW211

1510 *SAMPLE*
FAI 18-TW211-01
C.FELL
10/4/18
PRAS (EPA 537 MOD)
2.250m HDPE
PLACED IN PRECHILLED COOLER

4" FT TUBING

FAI PFAS
2393.03

10/4/18
C.FELL

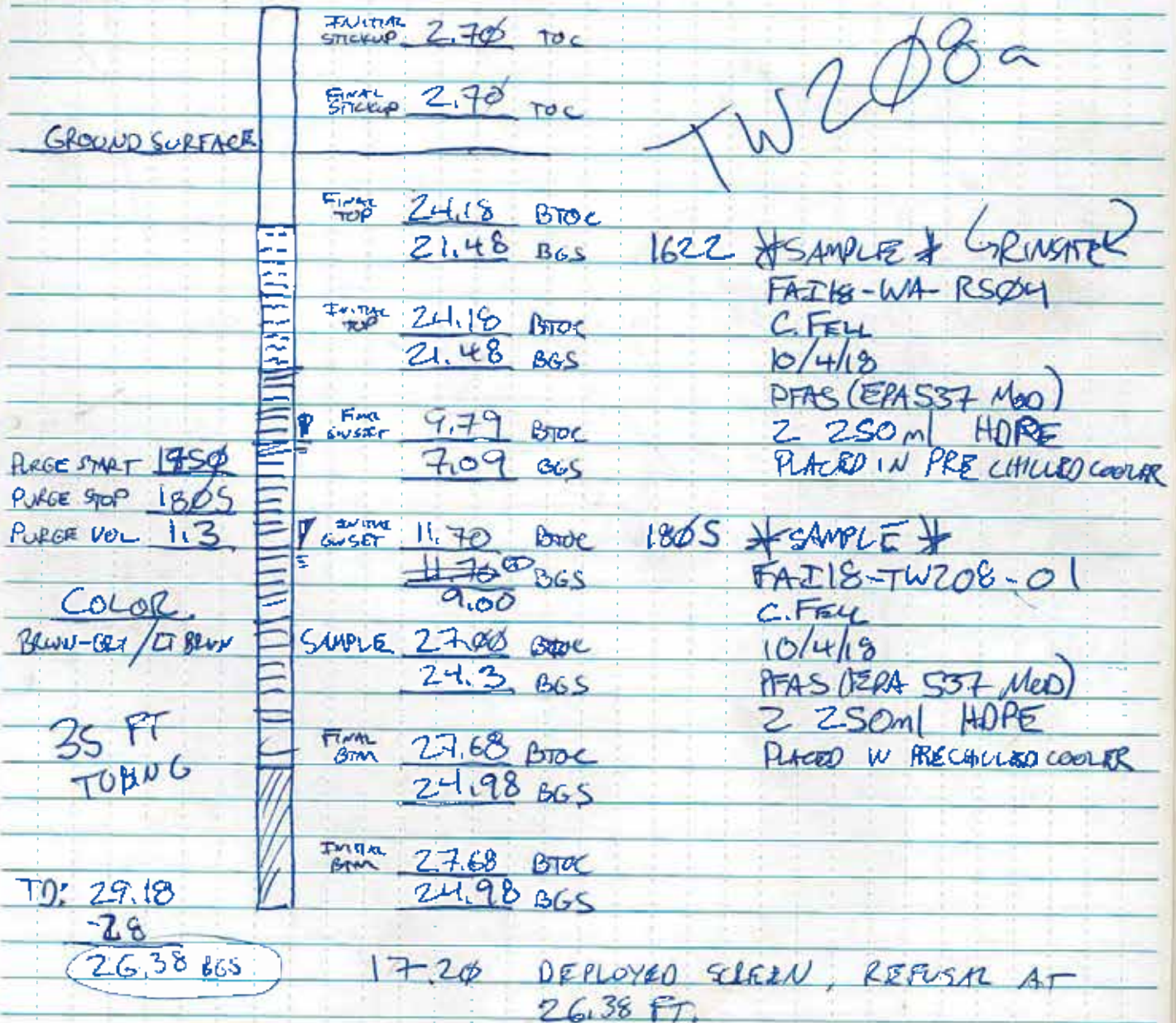
1525 MOVING TO TW208a

1540 DECON DRILL TOOLING

1653 SETTING UP ON TW208a

1702 TOOLING BROKE OFF AT 24 FT, LOST 19 FT IN GROUND

1712 RE DRILLED THE HOLE 3FT CLOSER TO



Scale: 1 square = _____

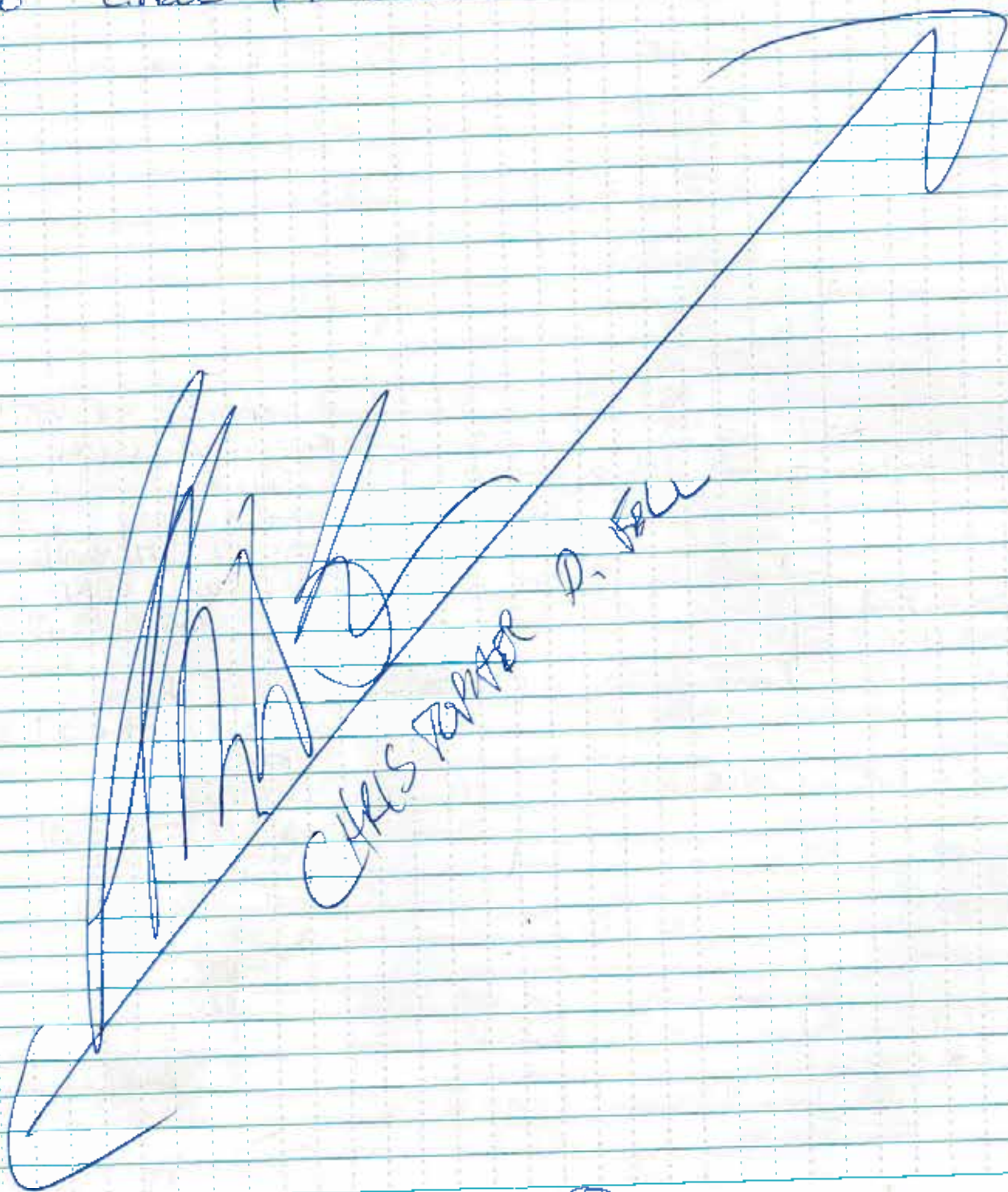
FAT PFAS
2393.03

10/4/18
C.FELL

1810 CLEANING UP AT TW208a

CONTAMINATED DECON H₂O

1830 C.FELL & DISCOVERY PULLING OFFSITE



CHRIS TAYLOR D. FELL

FAI PFAS
2393.03

10/5/18
C. FELL

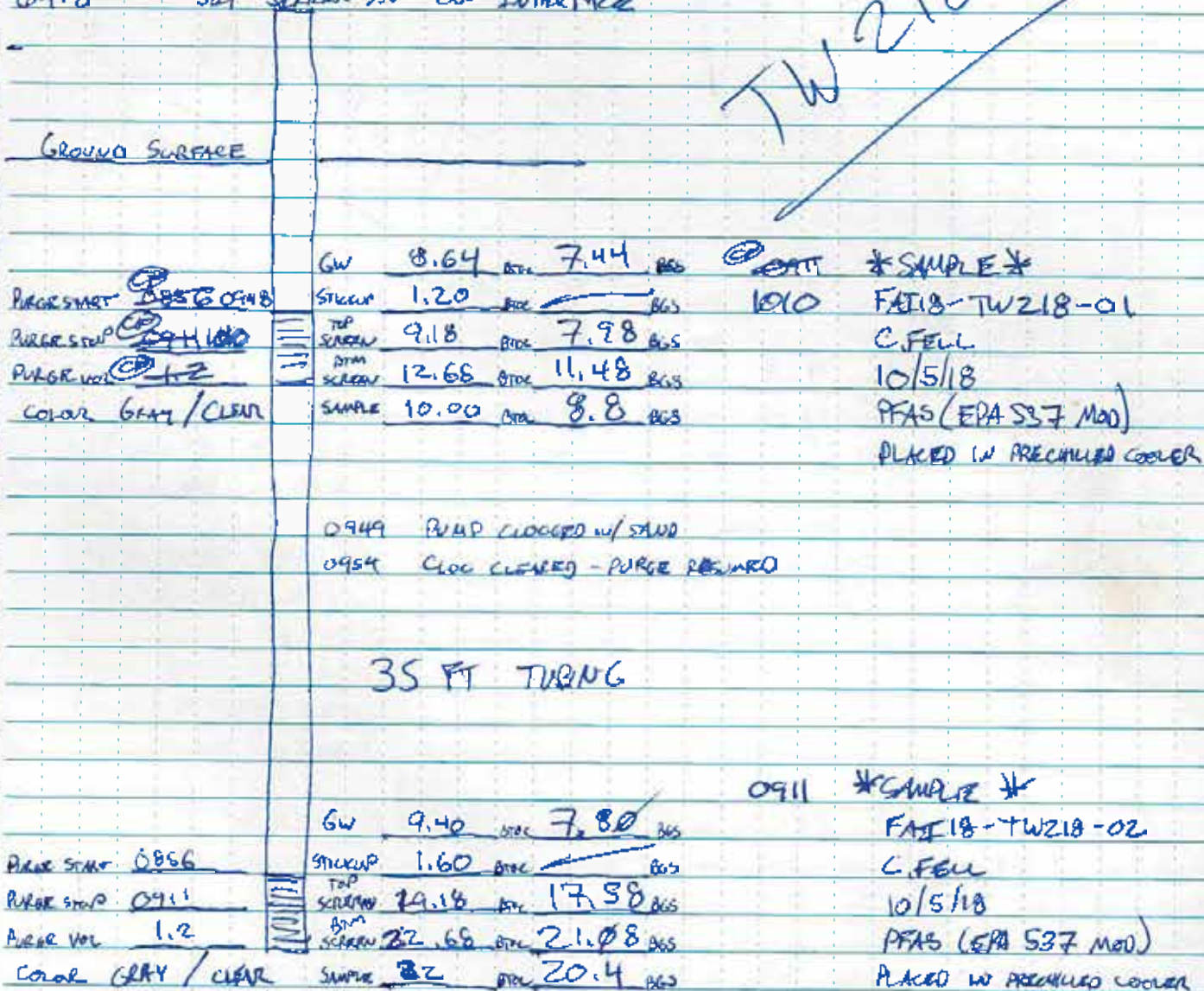
0730 SAFETY TAIL GATE
↳ CHRIS FELL RUM QRP
↳ SCOTT GAMBARD DISCOVERY BRUNEL

WX 30°F, CALM, CLEAR

0810 GETTING UP ON TW218 → SAMPLE AT GW AND 2.5 FT BELOW GW

0826 DEPLOYED SCREEN
0818 SET SCREEN AT GW INTERFACE

TW218a



TD: 34.18 - 10 (COMMON CEMENT RECORD)

- 2.50
31.68 → 10
21.18

Scale: 1 square =

(SI)

Notes on the back

10/5/18
C.FELL

FAZ PFAS
1015 @ 2393.03

1015 CLEANING UP AT TW218a, DECON WATER LEVEL INDICATOR

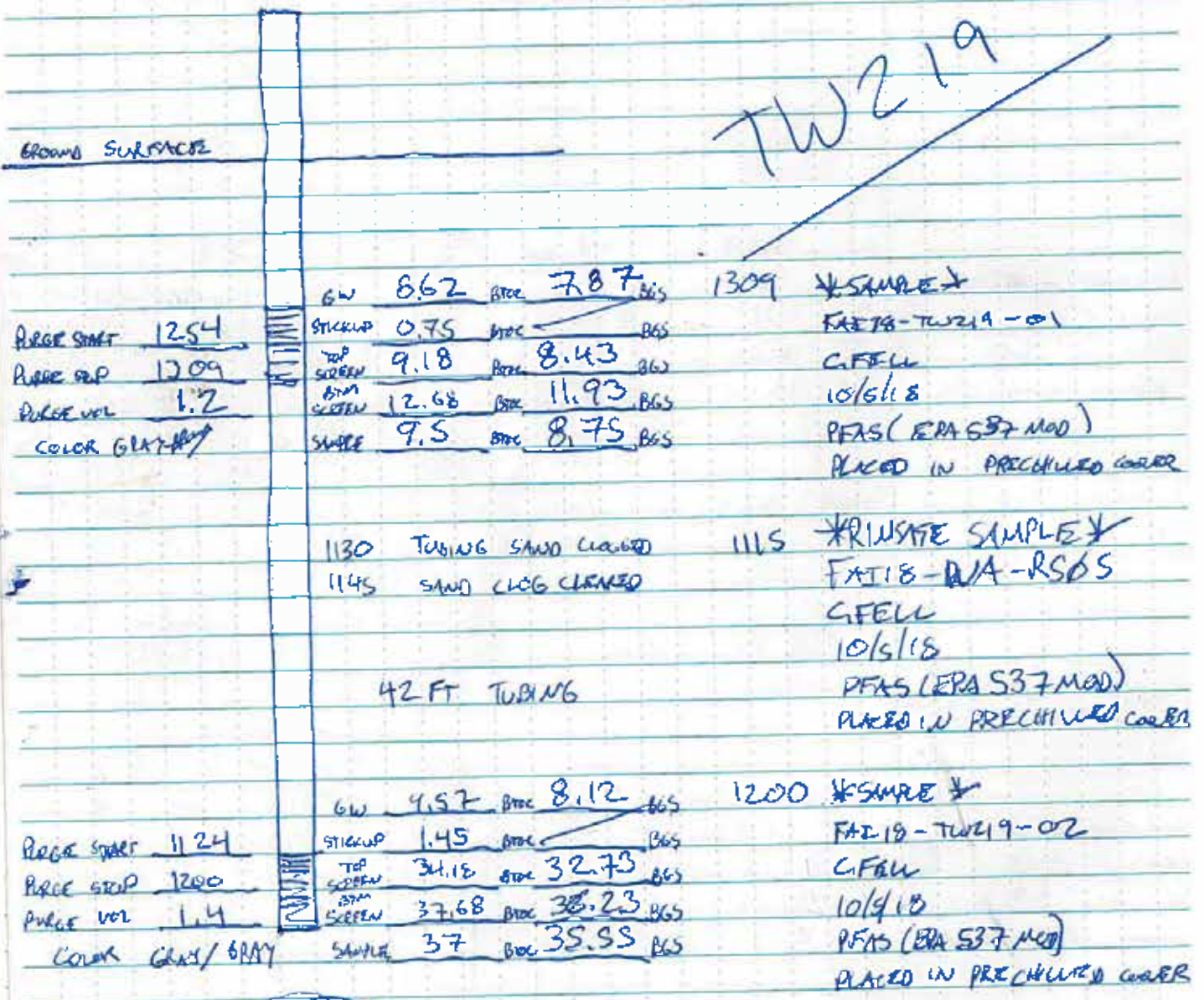
1022 MOVING TO TW219

1037 SETTING UP AT TW219

1054 DEPLOY SCREEN AT TW219 → SAMPLE AT 25' BELOW GW @ GW

1224 PULLING SCREEN UP TO GW

TW219



1309	*SAMPLE*	GW	8.62	PROC	7.87	BGS	1309	*SAMPLE*
		STICKUP	0.75	PROC		BGS		FAZ18-TW219-01
		TOP SCREEN	9.18	PROC	8.43	BGS		C.FELL
		BTM SCREEN	12.68	PROC	11.93	BGS		10/5/18
		SAMPLE	9.5	PROC	8.75	BGS		PFAS (EPA 537 MOD)
								PLACED IN PRECHILLED COOLER

1130	TUBING SAND CLEARED	1130	*RINSE SAMPLE*
1145	SAND CLOG CLEARED		FAZ18-TW219-RSOS
			C.FELL
			10/5/18
			PFAS (EPA 537 MOD)
			PLACED IN PRECHILLED COOLER

1200	*SAMPLE*	GW	4.57	PROC	8.12	BGS	1200	*SAMPLE*
		STICKUP	1.45	PROC		BGS		FAZ18-TW219-02
		TOP SCREEN	34.18	PROC	32.73	BGS		C.FELL
		BTM SCREEN	37.68	PROC	36.23	BGS		10/5/18
		SAMPLE	37	PROC	35.55	BGS		PFAS (EPA 537 MOD)
								PLACED IN PRECHILLED COOLER

TD = 34.18 - 0.3 = 33.88 BGS

FAE PFS
~~2393.03~~

10/5/18
 C.FEL

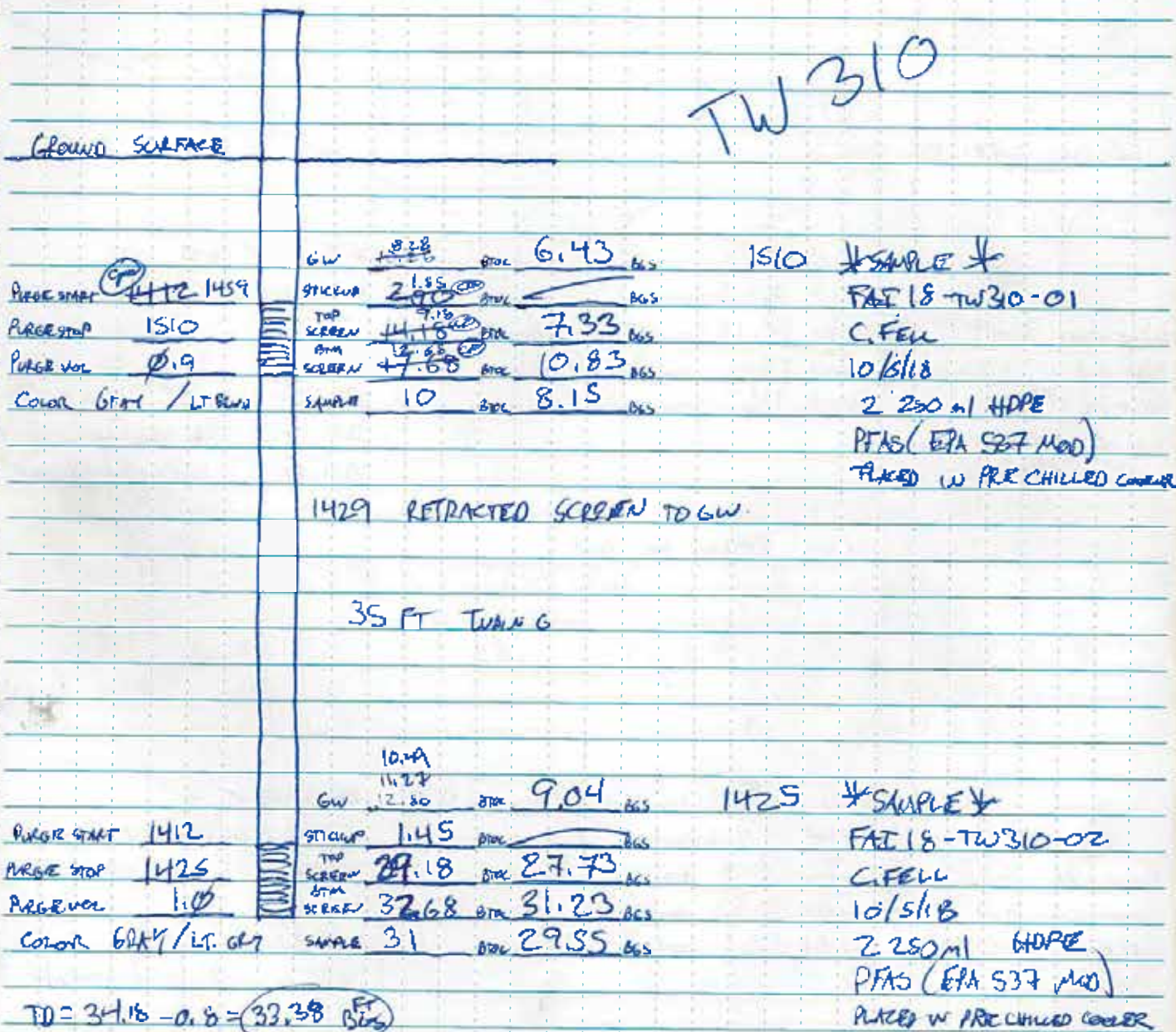
1312 CLEANING UP AT TW219, DECON WATER LEVEL INDICATOR
 & DISCONNECT DECON USED TOOLING DURING RIGGE
 TIMES.

1320 MOVING TO TW310

1330 SETTING UP ON TW310 → SAMPLE @ 25' BELOW GW @ GW

1342 DEPLOYING SCREEN

TW310



Scale: 1 square = _____

FAI PFS
2393.03

10/5/18
C.FELL

1515 CLEANING UP AT TW310, DECON WL INDICATOR

1523 MOVING TO TW302a

1527 SETTING UP ON TW302a, SMP AT 25' BELOW GW @ GW

1539 DEPLOYING SCREEN, INNER ROD STUCK, TOOLING BRACE OFF IN GROUND, STEP 1 FT ALONG ROAD AWAY FROM TRAIL BREAKER.

TW302a

GROUND SURFACE

	GW	11.68	DATE	8.43	LOGS
	STICKUP	3.25	DATE		LOGS
	TOP SCREEN	14.18	DATE	10.93	LOGS
	BTM SCREEN	17.68	DATE	14.43	LOGS
	SAMPLE	14.5	DATE	11.25	LOGS
PURGE START	1524				
PURGE STOP	1736				
PURGE VOL	0.9				
COLOR BRW/LT BRW					

1736 *SAMPLE*
 FAI18-TW302a-01
 C.FELL
 10/5/18
 2 250ml HDPE
 PFS (EPA 537 MOD)
 PLACED IN PRECHILLED COOLER

1607 DEPLOYED SCREEN ON RE-DRILL
 1654 RETRACT TO GW

38 FT TURNING

	GW	12.04	DATE	7.77	LOGS
	STICKUP	4.27	DATE		LOGS
	TOP SCREEN	29.18	DATE	24.91	LOGS
	BTM SCREEN	32.68	DATE	28.41	LOGS
	SAMPLE	32	DATE	27.75	LOGS
PURGE START	1637				
PURGE STOP	1649				
PURGE VOL	0.9				
COLOR BRW/BRW					

1649 *SAMPLE*
 FAI18-TW302-02
 C.FELL
 10/5/18
 2 250ml HDPE
 PFS (EPA 537 MOD)
 PLACED IN PRECHILLED COOLER

TID=29.18-0.2

Scale: 1 square =

FAE REAS
2393.03

10/5/18
C.FELL

1742 CLEANING UP AT TW 302a, DECON W/ INDICATOR

1759 MOVING TO TW207a

1803 SETTING UP ON TW207a

1813 DEPLOYING SCREEN

1909 SET SCREEN TO GW

2010 OFF SITE FOR DAY - DISCO @ 2pm

TW207a

GROUND SURFACE

1939	GW	8.13	PROG	5.30	BGS
	STICKUP	2.85	PROG		BGS
PURGE START 1843	TOP SCREEN	9.18	PROG	6.35	BGS
PURGE STOP 1952	BTM SCREEN	12.68	PROG	9.85	BGS
PURGE VOL 1.1	SAMPLE	9.5	PROG	6.77	BGS
COLOR CLY/CLR					

1952 *SAMPLE*

FAE18-TW207-01

C.FELL

10/5/18

2 250ml HDPE

PFAS (EPA 537 MOD)

PLACED IN PRECHILLED COOLER

1954 *SAMPLE DUPPLICATE*

FAE18-TW207-03

C.FELL

10/5/18

2 250ml HDPE

(PFAS EPA 537 MOD)

PLACED IN PRECHILLED COOLER

38 FT TUBING

1959 CLEAN UP AT TW207a

DUP FOR TW207-01

	GW	9.89	PROG	5.79	BGS
	STICKUP	4.10	PROG		BGS
PURGE START 1843	TOP SCREEN	29.18	PROG	25.08	BGS
PURGE STOP 1855	BTM SCREEN	32.68	PROG	28.58	BGS
PURGE VOL 1.0	SAMPLE	32	PROG	27.80	BGS
COLOR GRAY/LT BROWN					

1855 *SAMPLE*

FAE18-TW207-02

C.FELL

10/5/18

2 250ml HDPE

PFAS (EPA 537 MOD)

PLACED IN PRECHILLED COOLER

TD = 29.18 - 0.60 = 28.58 FT BGS

Scale: 1 square =

55

Return to Rain

FAZ PRAS
2393-03

X

10/6/18
C. FELL

0730

TAILGATE

CHRIS FELL
SCOTT BOMBARD

REM
DISCOVERY

COMP
DRIVER

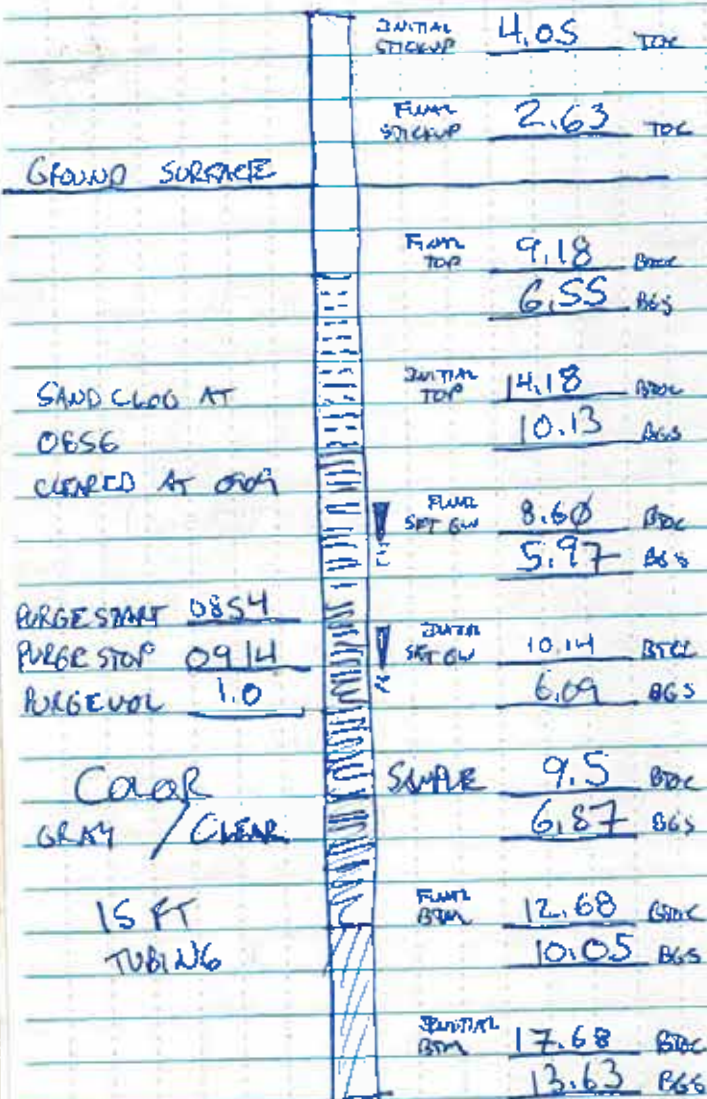
0740

DROVE ON ADA TO TW216

0804

SETTING UP AT TW216

WX: 36°F M. CLOUDY, CALM



TW216

GROUND SURFACE

SAND CLOG AT
0.856
CLEARED AT 0.914

PURGE START 0.854
PURGE STOP 0.914
PURGE VOL 1.0

COLOR
GRAY / CLEAR

15 FT
TUBING

TDZ 9.18 BGS DRY (D)
14.18 BGS

0814 DEPLOYED SCREEN - DRY → RESET TO 14.18 FT

0824 RR-DEPLOYED SCREEN

0914 *SAMPLE *

FAZ 18 - TW216 - 01

C. FELL
10/6/18
PRAS (EPA 537 MOD)

2 250ml HDPE
PLACED IN PRE CHILLED COOL

0916 *SAMPLE DUPLICATE *

FAZ 18 - TW216 - 02

C. FELL
10/6/18
PRAS (EPA 537 MOD)

2 250ml HDPE
PLACED IN PRE CHILLED COOL

Scale: 1 square =

FAZ PRAS
2393.03

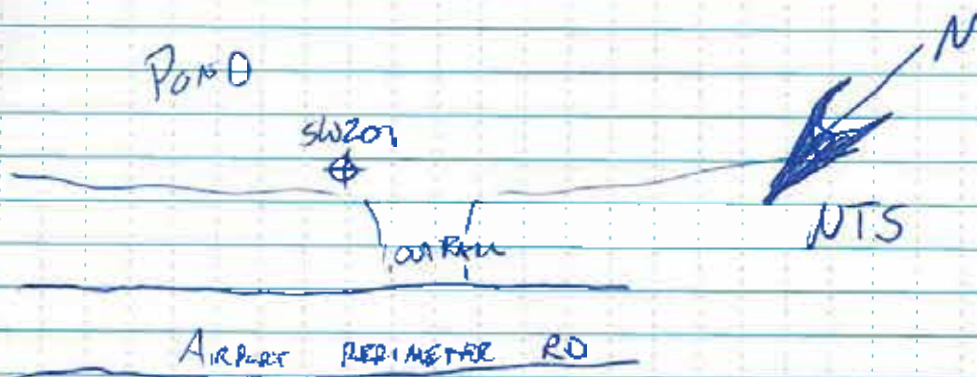
10/6/18
C. Fell

0924 CLEANING UP AT TWZ 16

GOING TO DROP OFF DROPS (2)

- 30 gal
- 10 gal

1000 RETURNED GATE CLICKERS & FAMP PERMITS.



1012 *SAMPLE*

FAZIS-SW201-01

C. FELL

10/6/18

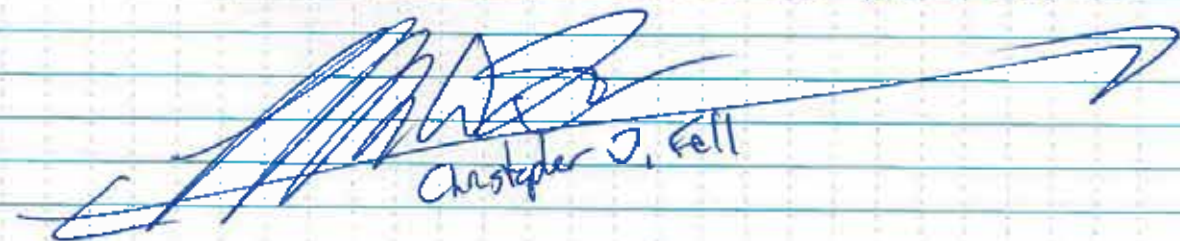
PRAS (EPA 537 MOD)

2 250 ML HOPE

PLACED IN RECHLOR COOLER

1030 LEFT RENTAL GEAR AT SOME STATION FOR
TIT PICKUP

1100 COOLERS "CADMIUM" AND "BARIUM" CUSTODY SEALED
AND CHECKED AS BAGGAGE ON AK AIRLINES


Christopher J. Fell

APPENDIX D

WELL SAMPLING FORMS

APPENDIX E

PHOTOGRAPH LOG

Photo 1



Description: Temporary monitoring well TW123a location.

Photo 2



Description: Temporary monitoring well TW103a location and sampling set up.

Photo 3



Description: Existing monitoring well MW15 location and sampling set up.

Photo 4



Description: Temporary monitoring well TW101 location during installation.

Photo 5



Description: Typical surface water sampling location.

Photo 6

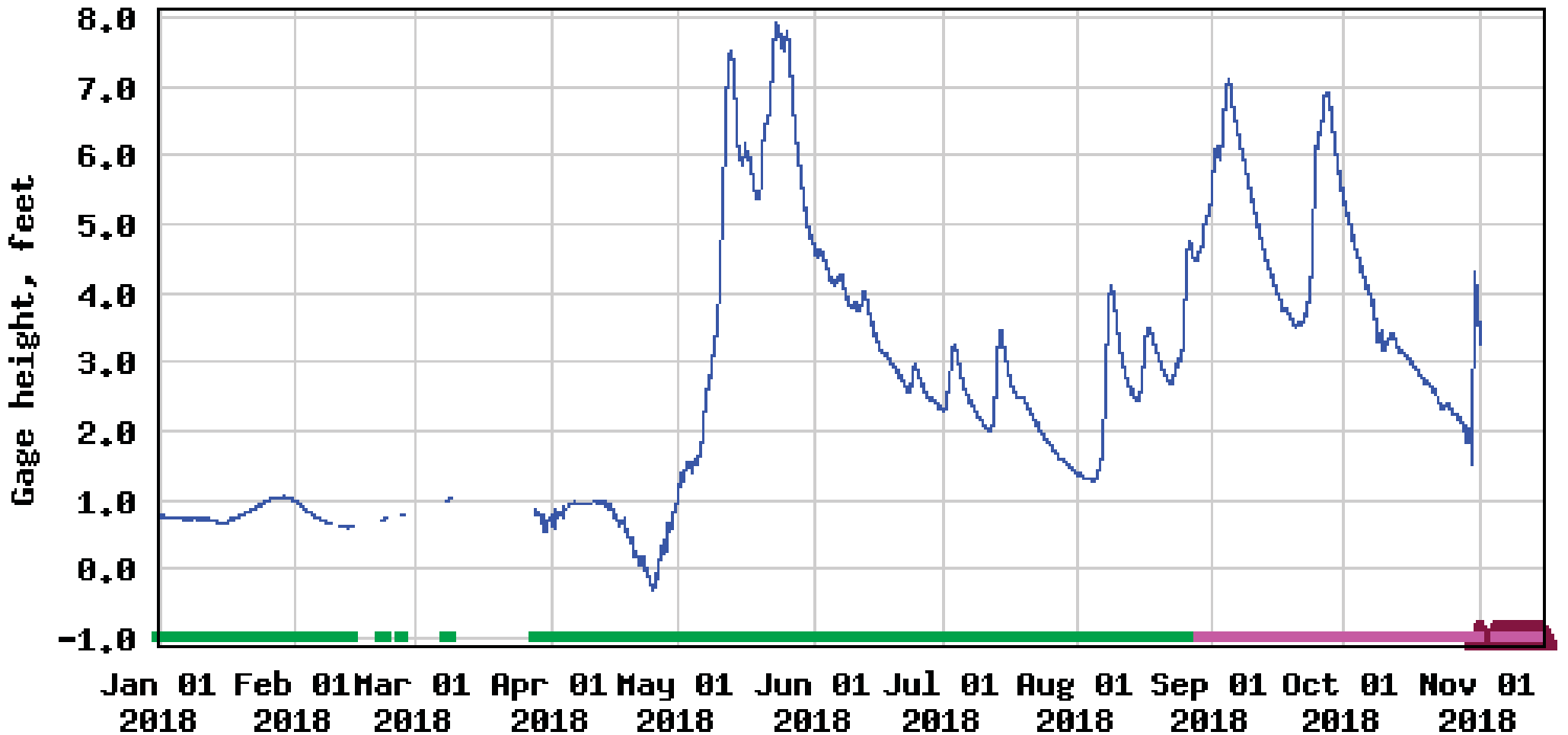


Description: Temporary monitoring well TW104 location.

APPENDIX F

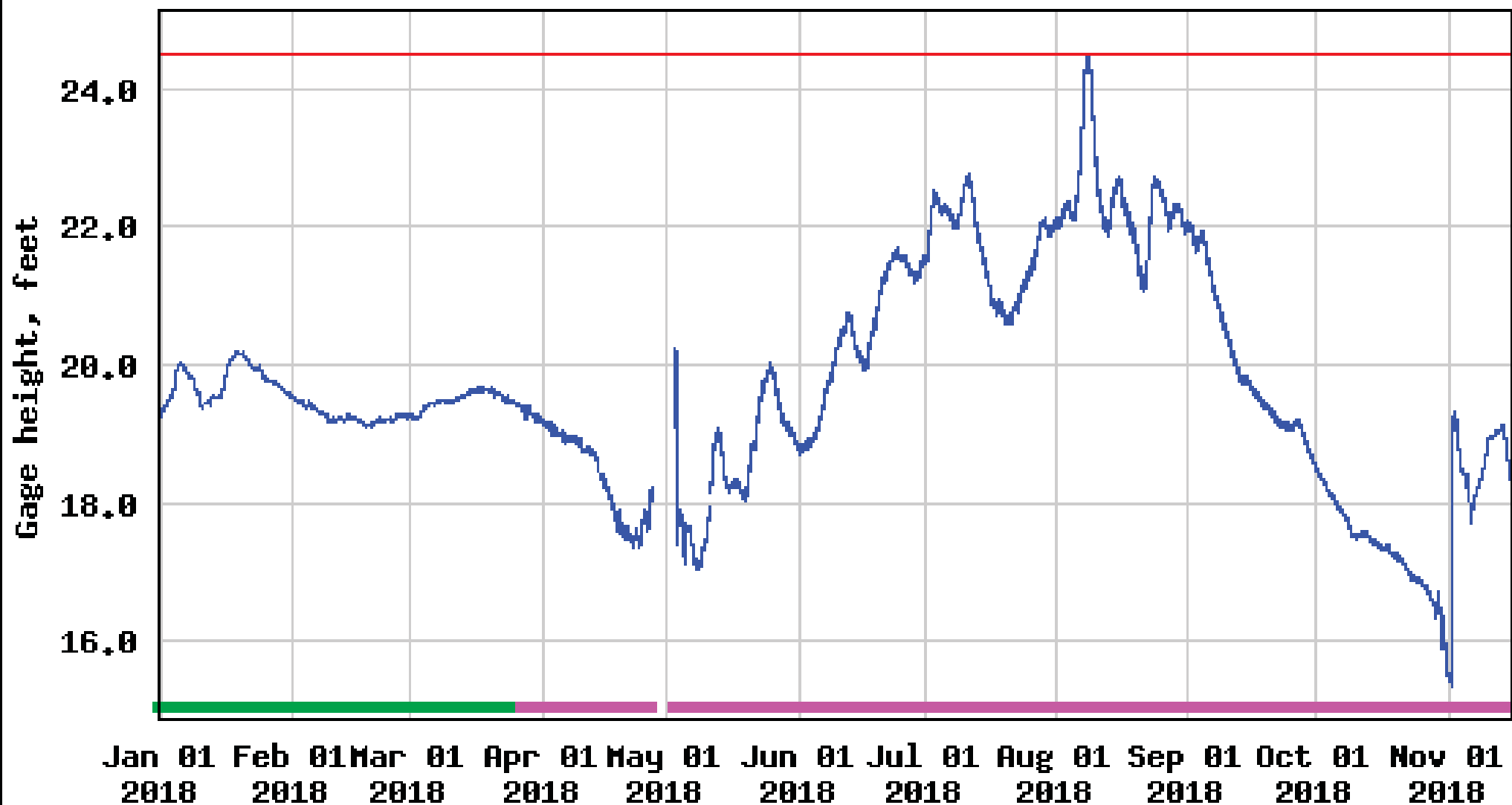
RIVER GAUGE DATA AND NGS DATASHEETS

USGS 15514000 CHENA R AT FAIRBANKS AK



- Gage height
- Period of approved data
- ▲ Value affected by equipment malfunction.
- Period of provisional data

USGS 15485500 TANANA R AT FAIRBANKS AK



- Gage height
- Period of approved data
- Period of provisional data
- NMS Flood Stage

Graph courtesy of the U.S. Geological Survey

The NGS Data Sheet

See file [dsdata.pdf](#) for more information about the datasheet.

PROGRAM = datasheet95, VERSION = 8.12.5.2

1 National Geodetic Survey, Retrieval Date = NOVEMBER 29, 2018

TT2853 *****

TT2853 DESIGNATION - Y 120

TT2853 PID - TT2853

TT2853 STATE/COUNTY- AK/FAIRBANKS NORTH STAR

TT2853 COUNTRY - US

TT2853 USGS QUAD - FAIRBANKS D-2

TT2853

TT2853 *CURRENT SURVEY CONTROL

TT2853

TT2853* NAD 83(1986) POSITION- 64 51 03. (N) 147 46 43. (W) SCALED

TT2853* [NAVD 88](#) ORTHO HEIGHT - 135.419 (meters) 444.29 (feet) ADJUSTED

TT2853

TT2853 GEOID HEIGHT - 9.441 (meters) GEOID12B

TT2853 DYNAMIC HEIGHT - 135.642 (meters) 445.02 (feet) COMP

TT2853 MODELED GRAVITY - 982,230.7 (mgal) NAVD 88

TT2853

TT2853 VERT ORDER - FIRST CLASS II

TT2853

TT2853.The horizontal coordinates were scaled from a topographic map and have an estimated accuracy of +/- 6 seconds.

TT2853.

TT2853.The orthometric height was determined by differential leveling and

TT2853.adjusted by the NATIONAL GEODETIC SURVEY

TT2853.in June 1991.

TT2853

TT2853.Significant digits in the geoid height do not necessarily reflect accuracy.

TT2853.GEOID12B height accuracy estimate available [here](#).

TT2853

TT2853.The dynamic height is computed by dividing the NAVD 88

TT2853.geopotential number by the normal gravity value computed on the

TT2853.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

TT2853.degrees latitude (g = 980.6199 gals.).

TT2853

TT2853.The modeled gravity was interpolated from observed gravity values.

TT2853

TT2853

TT2853_U.S. NATIONAL GRID SPATIAL ADDRESS: 6WVS630920(NAD 83)

TT2853

TT2853 SUPERSEDED SURVEY CONTROL

TT2853

TT2853 NGVD 29 (??/??/92) 133.869 (m) 439.20 (f) ADJ UNCH 1 2

TT2853

TT2853.Superseded values are not recommended for survey control.

TT2853

TT2853.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

TT2853.See file [dsdata.pdf](#) to determine how the superseded data were derived.

TT2853

TT2853_MARKER: DB = BENCH MARK DISK

TT2853_SETTING: 36 = SET IN A MASSIVE STRUCTURE

TT2853_SP_SET: FOUNDATION

TT2853_STAMPING: Y 120 1965

TT2853_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

TT2853

TT2853 HISTORY - Date Condition Report By

TT2853 HISTORY - 1965 MONUMENTED CGS

TT2853

TT2853

STATION DESCRIPTION

TT2853

TT2853'DESCRIBED BY COAST AND GEODETIC SURVEY 1965

TT2853'1.75 MI W FROM FAIRBANKS.

TT2853'1.75 MILES WEST ALONG THE ALASKA RAILROAD FROM THE STATION AT

TT2853'FAIRBANKS, 0.55 MILE EAST OF A STEEL-TRUSSED BRIDGE OVER NOYES SLOUGH,

TT2853'0.5 MILE WEST OF THE CROSSING OF A ROAD LEADING TO AURORA, 26.6 FEET

TT2853'WEST OF THE SOUTHWEST CORNER OF SCALE BUILDING NUMBER 470.19, 25 FEET

TT2853'SOUTH OF THE CENTER LINE OF A GRAVELED ROAD WHICH PARALLELS THE NORTH

TT2853'SIDE OF THE TRACKS, SET IN THE TOP OF THE NORTHWEST CORNER OF THE

TT2853'CONCRETE FOUNDATION FOR SOME RAILROAD CAR SCALES, 3.4 FEET NORTH OF

TT2853'THE NORTH RAIL ON THE NORTHERLY MOST SIDE OF THE TRACK, AND ABOUT

TT2853'LEVEL WITH THE TRACK.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

See file [dsdata.pdf](#) for more information about the datasheet.

PROGRAM = datasheet95, VERSION = 8.12.5.2

1 National Geodetic Survey, Retrieval Date = NOVEMBER 29, 2018

TT2886 *****

TT2886 DESIGNATION - C 121

TT2886 PID - TT2886

TT2886 STATE/COUNTY- AK/FAIRBANKS NORTH STAR

TT2886 COUNTRY - US

TT2886 USGS QUAD - FAIRBANKS D-2

TT2886

TT2886 *CURRENT SURVEY CONTROL

TT2886

TT2886* NAD 83(1986) POSITION- 64 49 11. (N) 147 42 14. (W) SCALED

TT2886* [NAVD 88](#) ORTHO HEIGHT - 135.370 (meters) 444.13 (feet) ADJUSTED

TT2886

TT2886 GEOID HEIGHT - 9.434 (meters) GEOID12B

TT2886 DYNAMIC HEIGHT - 135.593 (meters) 444.86 (feet) COMP

TT2886 MODELED GRAVITY - 982,227.1 (mgal) NAVD 88

TT2886

TT2886 VERT ORDER - FIRST CLASS II

TT2886

TT2886.The horizontal coordinates were scaled from a topographic map and have an estimated accuracy of +/- 6 seconds.

TT2886.

TT2886.The orthometric height was determined by differential leveling and

TT2886.adjusted by the NATIONAL GEODETIC SURVEY

TT2886.in June 1991.

TT2886

TT2886.Significant digits in the geoid height do not necessarily reflect accuracy.

TT2886.GEOID12B height accuracy estimate available [here](#).

TT2886

TT2886.The dynamic height is computed by dividing the NAVD 88

TT2886.geopotential number by the normal gravity value computed on the

TT2886.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

TT2886.degrees latitude (g = 980.6199 gals.).

TT2886

TT2886.The modeled gravity was interpolated from observed gravity values.

TT2886

TT2886

TT2886_U.S. NATIONAL GRID SPATIAL ADDRESS: 6WVS665885(NAD 83)

TT2886

TT2886 SUPERSEDED SURVEY CONTROL

TT2886

TT2886 NGVD 29 (??/??/92) 134.415 (m) 440.99 (f) ADJ UNCH 1 2

TT2886

TT2886.Superseded values are not recommended for survey control.

TT2886

TT2886.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

TT2886.See file [dsdata.pdf](#) to determine how the superseded data were derived.

TT2886

TT2886_MARKER: DB = BENCH MARK DISK

TT2886_SETTING: 46 = COPPER-CLAD STEEL ROD W/O SLEEVE (10 FT.+)

TT2886_STAMPING: C 121 1965

TT2886_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

TT2886

TT2886 HISTORY - Date Condition Report By

TT2886 HISTORY - 1965 MONUMENTED CGS

TT2886 HISTORY - 1975 GOOD NGS

TT2886

TT2886

STATION DESCRIPTION

TT2886

TT2886'DESCRIBED BY NATIONAL GEODETIC SURVEY 1975

TT2886'1.1 MI SE FROM FAIRBANKS.

TT2886'1.1 MILES SOUTHEAST ALONG STATE HIGHWAY 2 FROM THE JUNCTION OF AIRPORT

TT2886'WAY AT FAIRBANKS, 0.1 MILE SOUTHEAST ALONG OLD RICHARDSON HIGHWAY FROM

TT2886'THE JUNCTION OF 30TH AVENUE, 150 YARDS SOUTH OF THE CENTER LINE OF THE

TT2886'SOUTH LANES OF THE HIGHWAY, 36 FEET NORTH OF THE CENTER LINE OF THE

TT2886'OLD RICHARDSON HIGHWAY, 55.5 FEET SOUTH OF THE SOUTHWEST CORNER OF A

TT2886'FRAME BUILDING OCCUPIED BY A MOBILE HOME SERVICE DEPARTMENT, 1 1/2

TT2886'FEET WEST OF A POWER LINE POLE WITH A LIGHT AND A GUY WIRE, 0.6 FOOT

TT2886'EAST OF A METAL WITNESS POST, ABOUT LEVEL WITH THE HIGHWAY, AND A DISK

TT2886'ON THE TOP OF A COPPER COATED ROD DRIVEN TO A DEPTH OF 30 FEET. THE

TT2886'DISK PROJECTS 0.3 FOOT ABOVE THE GROUND AND IS PROTECTED BY A 5-INCH

TT2886'ORANGEBURG PIPE WHICH PROJECTS 0.7 FOOT ABOVE THE GROUND. SEC 23, T1S,

TT2886'R 1W.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

See file [dsdata.pdf](#) for more information about the datasheet.

PROGRAM = datasheet95, VERSION = 8.12.5.2

1 National Geodetic Survey, Retrieval Date = NOVEMBER 29, 2018

TT2904 *****

TT2904 DESIGNATION - Q 118

TT2904 PID - TT2904

TT2904 STATE/COUNTY- AK/FAIRBANKS NORTH STAR

TT2904 COUNTRY - US

TT2904 USGS QUAD - FAIRBANKS D-2

TT2904

TT2904 *CURRENT SURVEY CONTROL

TT2904

TT2904* NAD 83(1986) POSITION- 64 51 05. (N) 147 55 54. (W) SCALED

TT2904* [NAVD 88](#) ORTHO HEIGHT - 155.289 (meters) 509.48 (feet) ADJUSTED

TT2904

TT2904 GEOID HEIGHT - 9.538 (meters) GEOID12B

TT2904 DYNAMIC HEIGHT - 155.545 (meters) 510.32 (feet) COMP

TT2904 MODELED GRAVITY - 982,235.4 (mgal) NAVD 88

TT2904

TT2904 VERT ORDER - FIRST CLASS II

TT2904

TT2904.The horizontal coordinates were scaled from a topographic map and have
TT2904.an estimated accuracy of +/- 6 seconds.

TT2904.

TT2904.The orthometric height was determined by differential leveling and

TT2904.adjusted by the NATIONAL GEODETIC SURVEY

TT2904.in June 1991.

TT2904

TT2904.Significant digits in the geoid height do not necessarily reflect accuracy.

TT2904.GEOID12B height accuracy estimate available [here](#).

TT2904

TT2904.The dynamic height is computed by dividing the NAVD 88

TT2904.geopotential number by the normal gravity value computed on the

TT2904.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

TT2904.degrees latitude (g = 980.6199 gals.).

TT2904

TT2904.The modeled gravity was interpolated from observed gravity values.

TT2904

TT2904

TT2904_U.S. NATIONAL GRID SPATIAL ADDRESS: 6WVS558922(NAD 83)

TT2904

TT2904 SUPERSEDED SURVEY CONTROL

TT2904

TT2904 NGVD 29 (??/??/92) 153.733 (m) 504.37 (f) ADJ UNCH 1 2

TT2904

TT2904.Superseded values are not recommended for survey control.

TT2904

TT2904.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

TT2904.See file [dsdata.pdf](#) to determine how the superseded data were derived.

TT2904

TT2904_MARKER: DB = BENCH MARK DISK

TT2904_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

TT2904_STAMPING: Q 118 1965

TT2904_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

TT2904+STABILITY: SURFACE MOTION

TT2904

TT2904 HISTORY - Date Condition Report By

TT2904 HISTORY - 1965 MONUMENTED CGS

TT2904

TT2904

STATION DESCRIPTION

TT2904

TT2904'DESCRIBED BY COAST AND GEODETIC SURVEY 1965

TT2904'6.65 MI W FROM FAIRBANKS.

TT2904'4.75 MILES WEST ALONG THE ALASKA RAILROAD FROM THE STATION AT

TT2904'FAIRBANKS, THENCE 1.9 MILES SOUTHWEST ALONG STATE HIGHWAY 3, 98 FEET

TT2904'NORTHWEST OF THE CENTER OF THE JUNCTION OF A TRACK ROAD LEADING

TT2904'SOUTHEAST, IN A LARGE FLAT GRAVELED AREA, 95 FEET NORTHWEST OF THE

TT2904'CENTER LINE OF THE HIGHWAY, 1.2 FEET SOUTHWEST OF A 4 X 4-INCH

TT2904'CONCRETE HIGHWAY RIGHT-OF-WAY MARKER, 1.0 FOOT NORTHEAST OF A METAL

TT2904'WITNESS POST, ABOUT 3 FEET LOWER THAN THE HIGHWAY, A DISK ON THE TOP

TT2904'OF A CONCRETE POST PROJECTING 0.5 FOOT.

*** retrieval complete.

Elapsed Time = 00:00:04

APPENDIX G

CHEMICAL DATA SUMMARY

FIELD SAMPLE ID	LABORATORY SAMPLE ID	LOCATION ID	DEPTH (feet)	MATRIX	SAMPLE TYPE	QC NOTES	SAMPLER	DATE	TIME	SAMPLE DELIVERY GROUP	COOLER	EPA 537 (MODIFIED)	LATITUDE (WGS84)	LONGITUDE (WGS84)	ELEVATION (NAVD 88)
FAI18-TH101-01	320-42340-11	TH101	1.0 to 2.0	Soil	Primary	None	C. Fell	8/14/2018	16:11	320-42340	Lead	X	64.8237	-147.7959	N/A
FAI18-TH101-02	320-42340-12	TH101	5.0 to 6.0	Soil	Primary	None	C. Fell	8/14/2018	16:13	320-42340	Lead	X	64.8237	-147.7959	N/A
FAI18-TH102-01	320-42340-13	TH102	1.0 to 1.5	Soil	Primary	None	C. Fell	8/17/2018	13:30	320-42340	Lead	X	64.7991	-147.8815	N/A
FAI18-TH102-02	320-42340-14	TH102	1.0 to 1.5	Soil	Duplicate	FAI18-TH102-01	C. Fell	8/17/2018	13:31	320-42340	Lead	X	64.7991	-147.8815	N/A
FAI18-TH102-03	320-42340-15	TH102	4.0 to 5.0	Soil	Primary	None	C. Fell	8/17/2018	13:32	320-42340	Lead	X	64.7991	-147.8815	N/A
FAI18-TH103-01	320-42340-16	TH103	1.0 to 2.0	Soil	Primary	None	C. Fell	8/18/2018	12:44	320-42340	Lead	X	64.8127	-147.8742	433.08
FAI18-TH103-02	320-42340-17	TH103	6.5 to 7.5	Soil	Primary	None	C. Fell	8/18/2018	12:46	320-42340	Lead	X	64.8127	-147.8742	433.08
FAI18-TH104-01	320-42340-18	TH104	0.8 to 1.4	Soil	Primary	None	C. Fell	8/14/2018	14:04	320-42340	Lead	X	64.8235	-147.8137	N/A
FAI18-TH104-02	320-42340-19	TH104	5.3 to 5.8	Soil	Primary	None	C. Fell	8/14/2018	14:08	320-42340	Lead	X	64.8235	-147.8137	N/A
FAI18-SW101	320-42093-1	SW101	0.5	Surface Water	Primary	None	C. Fell	8/11/2018	9:22	320-42093	Gold	X	64.8320	-147.8779	N/A
FAI18-SW102	320-42093-2	SW102	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	17:24	320-42093	Gold	X	64.8201	-147.8938	N/A
FAI18-SW103	320-42093-3	SW103	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	15:45	320-42093	Gold	X	64.8106	-147.9057	N/A
FAI18-SW118	320-42093-18	SW103	0.5	Surface Water	Duplicate	FAI18-SW103	C. Fell	8/10/2018	15:47	320-42093	Gold	X	64.8106	-147.9057	N/A
FAI18-SW104	320-42093-4	SW104	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	12:07	320-42093	Gold	X	64.8204	-147.8699	N/A
FAI18-SW105	320-42093-5	SW105	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	12:23	320-42093	Gold	X	64.8231	-147.8643	N/A
FAI18-SW106	320-42093-6	SW106	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	15:25	320-42093	Gold	X	64.8085	-147.9076	N/A
FAI18-SW117	320-42093-17	SW117	0.5	Surface Water	Duplicate	FAI18-SW106	C. Fell	8/10/2018	15:26	320-42093	Gold	X	64.8085	-147.9076	N/A
FAI18-SW107	320-42093-7	SW107	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	13:20	320-42093	Gold	X	64.7996	-147.8830	N/A
FAI18-SW108	320-42093-8	SW108	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	13:44	320-42093	Gold	X	64.7973	-147.8773	N/A
FAI18-SW109	320-42093-9	SW109	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	11:42	320-42093	Gold	X	64.8143	-147.8535	N/A
FAI18-SW110	320-42093-10	SW110	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	10:37	320-42093	Gold	X	64.8029	-147.8532	N/A
FAI18-SW111	320-42093-11	SW111	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	10:28	320-42093	Gold	X	64.7964	-147.8959	N/A
FAI18-SW112	320-42093-12	SW112	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	10:59	320-42093	Gold	X	64.8116	-147.8444	N/A
FAI18-SW113	320-42093-13	SW113	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	11:26	320-42093	Gold	X	64.8255	-147.8329	N/A
FAI18-SW114	320-42093-14	SW114	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	11:16	320-42093	Gold	X	64.8250	-147.8282	N/A
FAI18-SW115	320-42093-15	SW115	0.5	Surface Water	Primary	None	C. Fell	8/10/2018	17:59	320-42093	Gold	X	64.8285	-147.8532	N/A
FAI18-SW116	320-42093-16	SW116	0.5	Surface Water	Primary	None	C. Fell	8/11/2018	12:59	320-42093	Gold	X	64.8040	-147.9162	N/A
FAI18-MW15	320-42093-19	MW15	1.5	Groundwater	Primary	None	C. Fell	8/11/2018	14:06	320-42093	Gold	X	64.8149	-147.8715	N/A
FAI18-MW38	320-42093-23	MW15	1.5	Groundwater	Duplicate	FAI18-MW15	C. Fell	8/11/2018	14:08	320-42093	Gold	X	64.8149	-147.8715	N/A
FAI18-MW18	320-42093-20	MW18	2	Groundwater	Primary	None	C. Fell	8/10/2018	14:55	320-42093	Gold	X	64.8161	-147.8693	N/A
FAI18-MW30R	320-42093-21	MW30R	0.5 to 2.0	Groundwater	Primary	None	C. Fell	8/11/2018	12:10	320-42093	Gold	X	64.8145	-147.8749	N/A
FAI18-MW34	320-42093-22	MW34	1.5	Groundwater	Primary	None	C. Fell	8/11/2018	8:52	320-42093	Gold	X	64.8147	-147.8777	N/A
FAI18-TW101-05	320-42334-5	TW101	1.42	Groundwater	Primary	None	C. Fell	8/17/2018	14:52	320-42334	Silver	X	64.7991	-147.8815	433.17
FAI18-TW101-07	320-42334-7	TW101	1.42	Groundwater	Duplicate	FAI18-TW101-05	C. Fell	8/17/2018	14:53	320-42334	Silver	X	64.7991	-147.8815	433.17
FAI18-TW101-04	320-42334-4	TW101	11.42	Groundwater	Primary	None	C. Fell	8/17/2018	14:18	320-42334	Silver	X	64.7991	-147.8815	433.17
FAI18-TW101-03	320-42334-3	TW101	36.42	Groundwater	Primary	None	C. Fell	8/17/2018	13:43	320-42334	Silver	X	64.7991	-147.8815	433.17
FAI18-TW101-02	320-42334-2	TW101	76.42	Groundwater	Primary	None	C. Fell	8/17/2018	13:06	320-42334	Silver	X	64.7991	-147.8815	433.17
FAI18-TW101-01	320-42334-1	TW101	116.42	Groundwater	Primary	None	C. Fell	8/17/2018	11:56	320-42334	Silver	X	64.7991	-147.8815	433.17
FAI18-TW101-06	320-42334-6	TW101	116.42	Groundwater	Replicate	FAI18-TW101-01	C. Fell	8/17/2018	12:31	320-42334	Silver	X	64.7991	-147.8815	433.17
FAI18-TW102-01	320-42334-8	TW102	1.52	Groundwater	Primary	None	C. Fell	8/18/2018	11:37	320-42334	Silver	X	64.7970	-147.8852	N/A
FAI18-TW103-01	320-42334-9	TW103	1.61	Groundwater	Primary	None	C. Fell	8/14/2018	18:03	320-42334	Silver	X	64.8023	-147.8973	429.24
FAI18-TW104-01	320-42334-10	TW104	1.42	Groundwater	Primary	None	C. Fell	8/18/2018	10:34	320-42334	Silver	X	64.8034	-147.8789	426.70
FAI18-TW105-01	320-42334-11	TW105	1.54	Groundwater	Primary	None	C. Fell	8/18/2018	14:42	320-42334	Silver	X	64.8060	-147.8862	428.51

FIELD SAMPLE ID	LABORATORY SAMPLE ID	LOCATION ID	DEPTH (feet)	MATRIX	SAMPLE TYPE	QC NOTES	SAMPLER	DATE	TIME	SAMPLE DELIVERY GROUP	COOLER	EPA 537 (MODIFIED)	LATITUDE (WGS84)	LONGITUDE (WGS84)	ELEVATION (NAVD 88)
FAI18-TW106-01	320-42334-12	TW106	1.66	Groundwater	Primary	None	C. Fell	8/18/2018	9:24	320-42334	Silver	X	64.8097	-147.8627	430.00
FAI18-TW107-01	320-42334-13	TW107	1.43	Groundwater	Primary	None	C. Fell	8/18/2018	15:52	320-42334	Silver	X	64.8015	-147.8763	N/A
FAI18-TW108-01	320-42334-14	TW108	1.46	Groundwater	Primary	None	C. Fell	8/17/2018	18:00	320-42334	Silver	X	64.8224	-147.8546	N/A
FAI18-TW109-01	320-42334-15	TW109	1.58	Groundwater	Primary	None	C. Fell	8/17/2018	19:09	320-42334	Silver	X	64.8214	-147.8598	N/A
FAI18-TW110-01	320-42334-16	TW110	1.49	Groundwater	Primary	None	C. Fell	8/17/2018	16:54	320-42334	Silver	X	64.8284	-147.8471	N/A
FAI18-TW111-01	320-42334-17	TW111	2.33	Groundwater	Primary	None	C. Fell	8/15/2018	15:34	320-42334	Silver	X	64.8264	-147.8654	N/A
FAI18-TW112-01	320-42334-18	TW112	2	Groundwater	Primary	None	C. Fell	8/14/2018	11:43	320-42334	Silver	X	64.8293	-147.8890	N/A
FAI18-TW113-01	320-42334-19	TW113	1.22	Groundwater	Primary	None	C. Fell	8/14/2018	10:05	320-42334	Silver	X	64.8233	-147.8964	N/A
FAI18-TW114-01	320-42334-20	TW114	1.52	Groundwater	Primary	None	C. Fell	8/13/2018	18:31	320-42334	Silver	X	64.8139	-147.8946	N/A
FAI18-TW115-05	320-42343-5	TW115	1.34	Groundwater	Primary	None	C. Fell	8/15/2018	14:47	320-42343	Zinc	X	64.8201	-147.8832	428.32
FAI18-TW115-04	320-42343-4	TW115	26.84	Groundwater	Primary	None	C. Fell	8/15/2018	14:01	320-42343	Zinc	X	64.8201	-147.8832	428.32
FAI18-TW115-03	320-42343-3	TW115	52.34	Groundwater	Primary	None	C. Fell	8/15/2018	13:28	320-42343	Zinc	X	64.8201	-147.8832	428.32
FAI18-TW115-02	320-42343-2	TW115	90.34	Groundwater	Primary	None	C. Fell	8/15/2018	12:40	320-42343	Zinc	X	64.8201	-147.8832	428.32
FAI18-TW115-06	320-42343-6	TW115	90.34	Groundwater	Replicate	FAI18-TW115-02	C. Fell	8/15/2018	13:01	320-42343	Zinc	X	64.8201	-147.8832	428.32
FAI18-TW115-01	320-42343-1	TW115	117.94	Groundwater	Primary	None	C. Fell	8/15/2018	12:02	320-42343	Zinc	X	64.8201	-147.8832	428.32
FAI18-TW116-01	320-42343-7	TW116	1.6	Groundwater	Primary	None	C. Fell	8/16/2018	18:20	320-42343	Zinc	X	64.8190	-147.8721	427.32
FAI18-TW117-01	320-42343-8	TW117	1.8	Groundwater	Primary	None	C. Fell	8/15/2018	18:15	320-42343	Zinc	X	64.8255	-147.8778	430.92
FAI18-TW118-01	320-42343-9	TW118	1.28	Groundwater	Primary	None	C. Fell	8/17/2018	9:28	320-42343	Zinc	X	64.8237	-147.8894	N/A
FAI18-TW119-01	320-42343-10	TW119	0.58	Groundwater	Primary	None	C. Fell	8/16/2018	8:35	320-42343	Zinc	X	64.8147	-147.8861	429.51
FAI18-TW120-07	320-42343-17	TW120	2.4	Groundwater	Primary	None	C. Fell	8/13/2018	15:10	320-42343	Zinc	X	64.8033	-147.9182	N/A
FAI18-TW120-04	320-42343-14	TW120	15.4	Groundwater	Primary	None	C. Fell	8/13/2018	14:42	320-42343	Zinc	X	64.8033	-147.9182	N/A
FAI18-TW120-03	320-42343-13	TW120	39.4	Groundwater	Primary	None	C. Fell	8/13/2018	14:19	320-42343	Zinc	X	64.8033	-147.9182	N/A
FAI18-TW120-02	320-42343-12	TW120	80.4	Groundwater	Primary	None	C. Fell	8/13/2018	13:56	320-42343	Zinc	X	64.8033	-147.9182	N/A
FAI18-TW120-01	320-42343-11	TW120	115.4	Groundwater	Primary	None	C. Fell	8/13/2018	13:01	320-42343	Zinc	X	64.8033	-147.9182	N/A
FAI18-TW120-05	320-42343-15	TW120	115.4	Groundwater	Duplicate	FAI18-TW120-01	C. Fell	8/13/2018	13:03	320-42343	Zinc	X	64.8033	-147.9182	N/A
FAI18-TW120-06	320-42343-16	TW120	115.4	Groundwater	Replicate	FAI18-TW120-01	C. Fell	8/13/2018	13:27	320-42343	Zinc	X	64.8033	-147.9182	N/A
FAI18-TW121-01	320-42343-18	TW121	0.45	Groundwater	Primary	None	C. Fell	8/15/2018	12:47	320-42343	Zinc	X	64.8098	-147.8949	427.77
FAI18-TW122-01	320-42343-19	TW122	1.2	Groundwater	Primary	None	C. Fell	8/14/2018	16:40	320-42343	Zinc	X	64.8237	-147.7959	N/A
FAI18-TW124-01	320-42343-20	TW124	1.21	Groundwater	Primary	None	C. Fell	8/14/2018	14:36	320-42343	Zinc	X	64.8235	-147.8137	N/A
FAI18-TW125-01	320-42340-1	TW125	1.63	Groundwater	Primary	None	C. Fell	8/15/2018	9:40	320-42340	Lead	X	64.8129	-147.8151	N/A
FAI18-TW126-01	320-42340-2	TW126	2.11	Groundwater	Primary	None	C. Fell	8/15/2018	11:02	320-42340	Lead	X	64.8186	-147.8332	N/A
FAI18-TW127-01	320-42340-3	TW127	1.52	Groundwater	Primary	None	C. Fell	8/15/2018	16:57	320-42340	Lead	X	64.8300	-147.8776	N/A
FAI18-TW128-01	320-42340-4	TW128	2.4	Groundwater	Primary	None	C. Fell	8/16/2018	9:52	320-42340	Lead	X	64.8237	-147.8679	N/A
FAI18-TW129-01	320-42340-5	TW129	1.71	Groundwater	Primary	None	C. Fell	8/16/2018	16:50	320-42340	Lead	X	64.8095	-147.9061	N/A
FAI18-TW130-01	320-42340-6	TW130	1.3	Groundwater	Primary	None	C. Fell	8/18/2018	13:16	320-42340	Lead	X	64.8127	-147.8742	433.08
FAI18-TW130-02	320-42340-7	TW130	1.3	Groundwater	Duplicate	FAI18-TW130-01	C. Fell	8/18/2018	13:17	320-42340	Lead	X	64.8127	-147.8742	433.08
FAI18-TW123-01	320-43995-1	TW123a	2	Groundwater	Primary	None	C. Fell	10/4/2018	11:10	320-43995	Cadmium	X	64.8346	-147.8273	N/A
FAI18-TW202-01	320-43995-2	TW202	1.4	Groundwater	Primary	None	C. Fell	10/4/2018	12:33	320-43995	Cadmium	X	64.8265	-147.8610	N/A
FAI18-TW207-01	320-43995-3	TW207a	1.5	Groundwater	Primary	None	C. Fell	10/5/2018	19:52	320-43995	Cadmium	X	64.8050	-147.8953	N/A
FAI18-TW207-03	320-43995-5	TW207a	1.5	Groundwater	Duplicate	FAI18-TW207-01	C. Fell	10/5/2018	19:54	320-43995	Cadmium	X	64.8050	-147.8953	N/A
FAI18-TW207-02	320-43995-4	TW207a	22.6	Groundwater	Primary	None	C. Fell	10/5/2018	18:55	320-43995	Cadmium	X	64.8050	-147.8953	N/A
FAI18-TW208-01	320-43995-6	TW208	17.2	Groundwater	Primary	None	C. Fell	10/4/2018	18:05	320-43995	Cadmium	X	64.8236	-147.8777	N/A
FAI18-TW210-01	320-43995-7	TW210	3.9	Groundwater	Primary	None	C. Fell	10/4/2018	13:47	320-43995	Cadmium	X	64.8275	-147.8692	N/A

FIELD SAMPLE ID	LABORATORY SAMPLE ID	LOCATION ID	DEPTH (feet)	MATRIX	SAMPLE TYPE	QC NOTES	SAMPLER	DATE	TIME	SAMPLE DELIVERY GROUP	COOLER	EPA 537 (MODIFIED)	LATITUDE (WGS84)	LONGITUDE (WGS84)	ELEVATION (NAVD 88)
FAI18-TW211-01	320-43995-8	TW211	25.1	Groundwater	Primary	None	C. Fell	10/4/2018	15:10	320-43995	Cadmium	X	64.8283	-147.8777	N/A
FAI18-TW216-01	320-43995-9	TW216	0.9	Groundwater	Primary	None	C. Fell	10/6/2018	9:14	320-43995	Cadmium	X	64.7994	-147.8874	N/A
FAI18-TW216-02	320-43995-10	TW216	0.9	Groundwater	Duplicate	FAI18-TW216-01	C. Fell	10/6/2018	9:16	320-43995	Cadmium	X	64.7994	-147.8874	N/A
FAI18-TW218-01	320-43994-1	TW218a	13.3	Groundwater	Primary	None	C. Fell	10/5/2018	10:10	320-43994	Barium	X	64.8224	-147.8863	N/A
FAI18-TW218-02	320-43994-2	TW218a	13	Groundwater	Primary	None	C. Fell	10/5/2018	9:11	320-43994	Barium	X	64.8224	-147.8863	N/A
FAI18-TW219-01	320-43994-3	TW219	0.9	Groundwater	Primary	None	C. Fell	10/5/2018	13:09	320-43994	Barium	X	64.8201	-147.8891	N/A
FAI18-TW219-02	320-43994-4	TW219	27.8	Groundwater	Primary	None	C. Fell	10/5/2018	12:00	320-43994	Barium	X	64.8201	-147.8891	N/A
FAI18-TW302-01	320-43994-5	TW302a	2.8	Groundwater	Primary	None	C. Fell	10/5/2018	17:36	320-43994	Barium	X	64.8067	-147.8916	N/A
FAI18-TW302-02	320-43994-6	TW302a	19.3	Groundwater	Primary	None	C. Fell	10/5/2018	16:49	320-43994	Barium	X	64.8067	-147.8916	N/A
FAI18-TW310-01	320-43994-7	TW-310	1.7	Groundwater	Primary	None	C. Fell	10/5/2018	15:10	320-43994	Barium	X	64.8149	-147.8823	N/A
FAI18-TW310-02	320-43994-8	TW-310	23.2	Groundwater	Primary	None	C. Fell	10/5/2018	14:25	320-43994	Barium	X	64.8149	-147.8823	N/A
FAI18-SW201-01	320-43995-11	SW201	0.5	Surface Water	Primary	None	C. Fell	10/6/2018	10:12	320-43995	Cadmium	X	64.7975	-147.8745	N/A
FAI18-WA-RS01	320-42340-8	FAI	N/A	Water	Primary	Rinsate Blank	C. Fell	8/16/2018	9:15	320-42340	Lead	X	N/A	N/A	N/A
FAI18-WA-RS02	320-42340-9	FAI	N/A	Water	Primary	Rinsate Blank	C. Fell	8/17/2018	15:10	320-42340	Lead	X	N/A	N/A	N/A
FAI18-WA-RS03	320-42340-10	FAI	N/A	Water	Primary	Rinsate Blank	C. Fell	8/18/2018	10:55	320-42340	Lead	X	N/A	N/A	N/A
FAI18-WA-RS04	320-43994-9	FAI	N/A	Water	Primary	Rinsate Blank	C. Fell	10/4/2018	16:22	320-43994	Barium	X	N/A	N/A	N/A
FAI18-WA-RS05	320-43994-10	FAI	N/A	Water	Primary	Rinsate Blank	C. Fell	10/5/2018	11:15	320-43994	Barium	X	N/A	N/A	N/A

Notes:

- 1 Latitude and longitude are based on recreational Global Positioning System measurements
- 2 Elevations reported for locations surveyed using differential level loops by a licensed professional land surveyor.
- 3 Samples were preserved between 0 and 6°C.
- 4 Soil samples were placed in 4 ounce HDPE containers
- 5 Water samples were placed in 250ml HDPE Containers

R&M Project No.: 2393.03	Field Sample ID:	FAI18-TH101-01	FAI18-TH101-02	FAI18-TH102-01	FAI18-TH102-02	FAI18-TH102-03	FAI18-TH103-01	FAI18-TH103-02	
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:	320-42340-11	320-42340-12	320-42340-13	320-42340-14	320-42340-15	320-42340-16	320-42340-17	
	Location ID:	TH101	TH101	TH102	TH102	TH102	TH103	TH103	
	Sample Type:	Primary	Primary	Primary	Duplicate (FAI18-TH102-01)	Primary	Primary	Primary	
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
	Test Boring ID:	TH101	TH101	TH102	TH102	TH102	TH103	TH103	
	Date Sampled:	8/14/2018	8/14/2018	8/17/2018	8/17/2018	8/17/2018	8/18/2018	8/18/2018	
	Time Sampled:	16:11	16:13	13:30	13:31	13:32	12:44	12:46	
	Depth Sampled (feet bgs):	1.0 to 2.0	5.0 to 6.0	1.0 to 1.5	1.0 to 1.5	4.0 to 5.0	1.0 to 2.0	6.5 to 7.5	
	Percent Solids:	83.3	80.3	95	94.5	81.9	97.8	94.9	
	Percent Moisture:	16.7	19.7	5	5.5	18.1	2.2	5.1	
	Units:	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	
Analysis	Analyte	Proposed Cleanup Level ¹							
EPA 537 Modified	PFBS	None Assigned	220 U	220 U	2,600	290 J	31,000	180 U	190 U
EPA 537 Modified	PFHpA	None Assigned	240 U	250 U	1,300	270 J	7,500	200 U	210 U
EPA 537 Modified	PFHxS	None Assigned	86 J	250 U	41,000	7,600	410,000	260 J	4,400
EPA 537 Modified	PFNA	None Assigned	240 U	250 U	250 J	190 J	820 J	200 U	210 U
EPA 537 Modified	PFOS	3,000	1,600	620 U	130,000	100,000	3,000,000 J	1,800	520 U
EPA 537 Modified	PFOA	1,700	240 U	250 U	5,500	2,300	42,000	210 J	2,500

Notes:

- Cleanup levels are based on 18 AAC 75 (ADEC, 2018a)
- Results that were non-detect are reported as the limit of detection (LOD) with a U flag and are highlighted light yellow in italics.
- Results with a detected concentration greater than 1/2 but below an ADEC cleanup level are highlighted blue and are in BOLD text.
- Results with a detected concentration exceeding an ADEC cleanup level are highlighted red and are in BOLD text.
- PFBS, PFHpA, PFHxS, PFNA, concentrations exceeding 10 times the associated groundwater action level (700 for PFHpA, PFHxS, and PFNA or 20,000 for PFBS) are highlighted orange and are in BOLD text.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
- J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TH104-01	FAI18-TH104-02				
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42340-18	320-42340-19				
	Location ID:		TH104	TH104				
	Sample Type:		Primary	Primary				
	Matrix:		Soil	Soil				
	Test Boring ID:		TH104	TH104				
	Date Sampled:		8/14/2018	8/14/2018				
	Time Sampled:		14:04	14:08				
	Depth Sampled (feet bgs):		0.8 to 1.4	5.3 to 5.8				
	Percent Solids:		83.4	71.7				
	Percent Moisture:		16.6	28.3				
Units:		ng/kg	ng/kg					
Analysis	Analyte	Proposed Cleanup Level¹						
EPA 537 Modified	PFBS	None Assigned	<i>220 U</i>	<i>250 U</i>				
EPA 537 Modified	PFHpA	None Assigned	<i>240 U</i>	<i>270 U</i>				
EPA 537 Modified	PFHxS	None Assigned	<i>240 U</i>	<i>270 U</i>				
EPA 537 Modified	PFNA	None Assigned	<i>240 U</i>	<i>270 U</i>				
EPA 537 Modified	PFOS	3,000	600 U	680 U				
EPA 537 Modified	PFOA	1,700	240 U	270 U				

Notes:

- Cleanup levels are based on 18 AAC 75 (ADEC, 2018a)
- Results that were non-detect are reported as the limit of detection (LOD) with a U flag and are highlighted light yellow in italics.
- Results with a detected concentration greater than 1/2 but below an ADEC cleanup level are highlighted blue and are in BOLD text.
- Results with a detected concentration exceeding an ADEC cleanup level are highlighted red and are in BOLD text.
- PFBS, PFHpA, PFHxS, PFNA, concentrations exceeding 10 times the associated groundwater action level (700 for PFHpA, PFHxS, and PFNA or 20,000 for PFBS) are highlighted orange and are in BOLD text.

Flagging Notes:

U Flag: Result was not detected above the LOD.

J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-SW101	FAI18-SW102	FAI18-SW103	FAI18-SW118	FAI18-SW104	FAI18-SW105	FAI18-SW106
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42093-1	320-42093-2	320-42093-3	320-42093-18	320-42093-4	320-42093-5	320-42093-6
	Location ID:		SW101	SW102	SW103	SW103	SW104	SW105	SW106
	Sample Type:		Primary	Primary	Primary	Duplicate (FAI18-SW103)	Primary	Primary	Primary
	Matrix:		Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Test Boring ID:		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Date Sampled:		8/11/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018
	Time Sampled:		9:22	17:24	15:45	15:47	12:07	12:23	15:25
	Depth Sampled (feet bws):		0.5	0.5	0.5	0.5	0.5	0.5	0.5
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	Perfluorobutanesulfonic acid (PFBS)	2,000	<i>0.83 U</i>	<i>0.81 U</i>	<i>0.84 U</i>	<i>0.88 U</i>	7.1	3.8	61
EPA 537 Modified	Perfluoroheptanoic acid (PFHpA)	See PFAS Combined	<i>1.2 U</i>	<i>1.2 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	9.0	2.3	10
EPA 537 Modified	Perfluorohexanesulfonic acid (PFHxS)	See PFAS Combined	0.61 J	0.54 J	0.54 J	0.53 J	39	13	250
EPA 537 Modified	Perfluorononanoic acid (PFNA)	See PFAS Combined	<i>1.2 U</i>	<i>1.2 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	3.8	0.89 J	<i>1.2 U</i>
EPA 537 Modified	Perfluorooctanesulfonic acid (PFOS)	See PFAS Combined	<i>2.5 U</i>	<i>2.4 U</i>	<i>2.5 U</i>	<i>2.6 U</i>	210	31	230
EPA 537 Modified	Perfluorooctanoic acid (PFOA)	See PFAS Combined	<i>1.2 U</i>	<i>1.2 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	14	4.3	96
EPA 537 Modified	Five PFAS Summation ⁵	70	6.7	6.5	6.9	7.0	280	51	590

Notes:

- 1 Action levels are based on the ADEC technical memorandum on action levels for PFAS in groundwater and drinking water (ADEC, 2018b)
- 2 Results that were non-detect are reported as the limit of detection (LOD) with a U flag and are highlighted light yellow in italics.
- 3 Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in BOLD text.
- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
- J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-SW117	FAI18-SW107	FAI18-SW108	FAI18-SW109	FAI18-SW110	FAI18-SW111	FAI18-SW112
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42093-17	320-42093-7	320-42093-8	320-42093-9	320-42093-10	320-42093-11	320-42093-12
	Location ID:		SW117	SW107	SW108	SW109	SW110	SW111	SW112
	Sample Type:		Duplicate (FAI18-SW106)	Primary	Primary	Primary	Primary	Primary	Primary
	Matrix:		Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
	Test Boring ID:		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Date Sampled:		8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018	8/10/2018
	Time Sampled:		15:26	13:20	13:44	11:42	10:37	10:28	10:59
	Depth Sampled (feet bws):		0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	65	14	4.0	0.94 J	1.2 J	0.59 J	1.1 J
EPA 537 Modified	PFHpA	See PFAS Combined	11	9.3	3.5	0.86 J	1.2 U	1.2 U	1.5 J
EPA 537 Modified	PFHxS	See PFAS Combined	230	82	37	4.5	7.6	3.0	2.9
EPA 537 Modified	PFNA	See PFAS Combined	1.3 U	1.1 J	0.55 J	1.2 U	1.2 U	1.2 U	1.2 U
EPA 537 Modified	PFOS	See PFAS Combined	230	130	55	3.0 J	11	4.4	5.9
EPA 537 Modified	PFOA	See PFAS Combined	99	9.1	7.2	3.1	0.96 J	0.86 J	1.8
EPA 537 Modified	Five PFAS Summation ⁵	70	570	230	100	13	22	11	13

Notes:

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- 2 Results that were non-detect are reported as the limit of detection (LOD) with a U flag and are highlighted light yellow in italics.
- 3 Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in BOLD text.
- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-SW113	FAI18-SW114	FAI18-SW115	FAI18-SW116	FAI18-MW15	FAI18-MW38	FAI18-MW18
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42093-13	320-42093-14	320-42093-15	320-42093-16	320-42093-19	320-42093-23	320-42093-20
	Location ID:		SW113	SW114	SW115	SW116	MW15	MW15	MW18
	Sample Type:		Primary	Primary	Primary	Primary	Primary	Duplicate (FAI18-MW15)	Primary
	Matrix:		Surface Water	Surface Water	Surface Water	Surface Water	Groundwater	Groundwater	Groundwater
	Test Boring ID:		Not Applicable	Not Applicable	Not Applicable	Not Applicable	MW15	MW15	MW18
	Date Sampled:		8/10/2018	8/10/2018	8/10/2018	8/11/2018	8/11/2018	8/11/2018	8/10/2018
	Time Sampled:		11:26	11:16	17:59	12:59	14:06	14:08	14:55
	Depth Sampled (feet bws):		0.5	0.5	0.5	0.5	1.5	1.5	2.0
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	7.5	0.82 J	<i>0.88 U</i>	<i>0.86 U</i>	4.9	5.0	13
EPA 537 Modified	PFHpA	See PFAS Combined	0.74 J	0.83 J	<i>1.3 U</i>	<i>1.3 U</i>	1.2 J	1.3 J	11
EPA 537 Modified	PFHxS	See PFAS Combined	2.9	3.5	0.58 J	0.67 J	20	20	54
EPA 537 Modified	PFNA	See PFAS Combined	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.4 U</i>	<i>1.4 U</i>	<i>1.3 U</i>
EPA 537 Modified	PFOS	See PFAS Combined	2.5 J	2.9 J	<i>2.6 U</i>	<i>2.6 U</i>	9.7	10	22
EPA 537 Modified	PFOA	See PFAS Combined	2.4	2.1	<i>1.3 U</i>	<i>1.3 U</i>	4.2	4.6	47
EPA 537 Modified	Five PFAS Summation ⁵	70	9.8	11	7.1	7.2	37	37	140

Notes:

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- 2 Results that were non-detect are reported as the limit of detection (LOD) with a U flag and are highlighted light yellow in italics.
- 3 Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in BOLD text.
- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-MW30R	FAI18-MW34	FAI18-TW101-05	FAI18-TW101-07	FAI18-TW101-04	FAI18-TW101-03	FAI18-TW101-02
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42093-21	320-42093-22	320-42334-5	320-42334-7	320-42334-4	320-42334-3	320-42334-2
	Location ID:		MW30R	MW34	TW101	TW101	TW101	TW101	TW101
	Sample Type:		Primary	Primary	Primary	Duplicate (FAI18-TW101-05)	Primary	Primary	Primary
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		MW30R	MW34	TW101	TW101	TW101	TW101	TW101
	Date Sampled:		8/11/2018	8/11/2018	8/17/2018	8/17/2018	8/17/2018	8/17/2018	8/17/2018
	Time Sampled:		12:10	8:52	14:52	14:53	14:18	13:43	13:06
	Depth Sampled (feet bws):		0.5 to 2.0	1.5	1.4	1.4	11.4	36.4	76.4
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	1,300	7.1	4,600	9,000	140	9.5 J	3.1
EPA 537 Modified	PFHpA	See PFAS Combined	120	4.6	3,200	3,000	10	2.8	1.3 J
EPA 537 Modified	PFHxS	See PFAS Combined	1,200	67	48,000 J	57,000 J	310	48 J	24
EPA 537 Modified	PFNA	See PFAS Combined	<i>1.4 U</i>	<i>1.3 U</i>	900	910	2.9	0.73 J	0.56 J
EPA 537 Modified	PFOS	See PFAS Combined	5.4	50	420,000 J	660,000 J	4,000	810	530
EPA 537 Modified	PFOA	See PFAS Combined	310	25	7,600	7,400	36	6.4	2.9
EPA 537 Modified	Five PFAS Summation ⁵	70	1,600	150	480000 J	740000 J	4,400	870 J	560

Notes:

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- 3 Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in BOLD text.
- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
- J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.
- QN Flag: Result has an unknown bias due to a quality control failure.

Chemical Data Summary:
Water Results

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW101-01	FAI18-TW101-06	FAI18-TW102-01	FAI18-TW103-01	FAI18-TW104-01	FAI18-TW105-01	FAI18-TW106-01
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42334-1	320-42334-6	320-42334-8	320-42334-9	320-42334-10	320-42334-11	320-42334-12
	Location ID:		TW101	TW101	TW102	TW103a	TW104	TW105	TW106
	Sample Type:		Primary	Replicate (FAI18-TW101-01)	Primary	Primary	Primary	Primary	Primary
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		TW101	TW101	TW102a	TW103a	TW104	TW105	TW106
	Date Sampled:		8/17/2018	8/17/2018	8/18/2018	8/14/2018	8/18/2018	8/18/2018	8/18/2018
	Time Sampled:		11:56	12:31	11:37	18:03	10:34	14:42	9:24
	Depth Sampled (feet bws):		116.4	116.4	1.5	1.6	1.4	1.5	1.7
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	1.8	1.8	2.5	35	200 J	33	2.5 J
EPA 537 Modified	PFHpA	See PFAS Combined	0.75 J	0.79 J	1.3 U	24	430	30	1.3 UJ
EPA 537 Modified	PFHxS	See PFAS Combined	15	16	4.5	990	1,700	300	13 J
EPA 537 Modified	PFNA	See PFAS Combined	1.3 U	0.44 J	1.3 U	1.2 U	16	1.3 U	1.3 UJ
EPA 537 Modified	PFOS	See PFAS Combined	310	330	2.6 U	140	390	980	12 J
EPA 537 Modified	PFOA	See PFAS Combined	1.8	1.9	0.71 J	180	710	47	14 J
EPA 537 Modified	Five PFAS Summation ⁵	70	330	350	10	1,300	3,200 J	1,400	42 J

Notes:

- 1 Action levels are based on the ADEC technical memorandum on action levels for PFAS in groundwater and drinking water (ADEC, 2018b)
- 2 Results that were non-detect are reported as the limit of detection (LOD) with a U flag and are highlighted light yellow in italics.
- 3 Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in BOLD text.
- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

Chemical Data Summary:
Water Results

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW107-01	FAI18-TW108-01	FAI18-TW109-01	FAI18-TW110-01	FAI18-TW111-01	FAI18-TW112-01	FAI18-TW113-01
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42334-13	320-42334-14	320-42334-15	320-42334-16	320-42334-17	320-42334-18	320-42334-19
	Location ID:		TW107	TW108	TW109	TW110	TW111	TW112	TW113
	Sample Type:		Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		TW107	TW108a	TW109	TW110a	TW111a	TW112	TW113a
	Date Sampled:		8/18/2018	8/17/2018	8/17/2018	8/17/2018	8/15/2018	8/14/2018	8/14/2018
	Time Sampled:		15:52	18:00	19:09	16:54	15:34	11:43	10:05
	Depth Sampled (feet bws):		1.4	1.5	1.6	1.5	2.3	2.0	1.2
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	71	13	6.1	77	120	1.6 J	2.4
EPA 537 Modified	PFHpA	See PFAS Combined	18	2.3	6.5	1.6 J	19	0.68 J	1.1 J
EPA 537 Modified	PFHxS	See PFAS Combined	460	240	140	67	120	3.3	2.1
EPA 537 Modified	PFNA	See PFAS Combined	<i>1.3 U</i>	<i>1.3 U</i>	0.87 J	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.2 U</i>
EPA 537 Modified	PFOS	See PFAS Combined	30	15	45	0.96 J	7.6	4.2	1.6 J
EPA 537 Modified	PFOA	See PFAS Combined	210	24	12	3.8	18	0.83 J	0.70 J
EPA 537 Modified	Five PFAS Summation ⁵	70	720	280	200	75	170	10	6.7

Notes:

- 1 Action levels are based on the ADEC technical memorandum on action levels for PFAS in groundwater and drinking water (ADEC, 2018b)
- 2 Results that were non-detect are reported as the limit of detection (LOD) with a U flag and are highlighted light yellow in italics.
- 3 Results with a detected concentration greater than 1/2 but below an ADEC action level are highlighted blue and are in BOLD text.
- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW114-01	FAI18-TW115-05	FAI18-TW115-04	FAI18-TW115-03	FAI18-TW115-02	FAI18-TW115-06	FAI18-TW115-01
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42334-20	320-42343-5	320-42343-4	320-42343-3	320-42343-2	320-42343-6	320-42343-1
	Location ID:		TW114	TW115	TW115	TW115	TW115	TW115	TW115
	Sample Type:		Primary	Primary	Primary	Primary	Primary	Replicate (FAI18-TW115-02)	Primary
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		TW114a	TW115a	TW115a	TW115a	TW115a	TW115a	TW115a
	Date Sampled:		8/13/2018	8/15/2018	8/15/2018	8/15/2018	8/15/2018	8/15/2018	8/15/2018
	Time Sampled:		18:31	14:47	14:01	13:28	12:40	13:01	12:02
	Depth Sampled (feet bws):		1.5	1.3	26.8	52.3	90.3	90.3	117.9
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	0.57 J	26	14	9.6	0.89 J	1.1 J	<i>0.88 U</i>
EPA 537 Modified	PFHpA	See PFAS Combined	<i>1.2 U</i>	20	7.8	4.9	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 U</i>
EPA 537 Modified	PFHxS	See PFAS Combined	1.1 J	170	69	43	3.2	3.5	0.98 J
EPA 537 Modified	PFNA	See PFAS Combined	<i>1.2 U</i>	2.5	1.8	1.4 J	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 U</i>
EPA 537 Modified	PFOS	See PFAS Combined	6.2	1,600	440	340	15	18	4.6
EPA 537 Modified	PFOA	See PFAS Combined	<i>1.2 U</i>	27	17	13	2.3	2.1	0.95 J
EPA 537 Modified	Five PFAS Summation ⁵	70	11	1,800	540	400	23	26	9.1

Notes:

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- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

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J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW116-01	FAI18-TW117-01	FAI18-TW118-01	FAI18-TW119-01	FAI18-TW120-07	FAI18-TW120-04	FAI18-TW120-03
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42343-7	320-42343-8	320-42343-9	320-42343-10	320-42343-17	320-42343-14	320-42343-13
	Location ID:		TW116	TW117	TW118	TW119	TW120	TW120	TW120
	Sample Type:		Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		TW116	TW117a	TW118a	TW119	TW120	TW120	TW120
	Date Sampled:		8/16/2018	8/15/2018	8/17/2018	8/16/2018	8/13/2018	8/13/2018	8/13/2018
	Time Sampled:		18:20	18:15	9:28	8:35	15:10	14:42	14:19
	Depth Sampled (feet bws):		1.6	1.8	1.3	0.6	2.4	15.4	39.4
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	2.7	14	20	12	2.4 J	2.7	4.5
EPA 537 Modified	PFHpA	See PFAS Combined	2.9	1.8	2.5	1.2 J	1.0 J	0.89 J	1.1 J
EPA 537 Modified	PFHxS	See PFAS Combined	15	16	13	27	13 J	17	28
EPA 537 Modified	PFNA	See PFAS Combined	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 UJ</i>	<i>1.3 U</i>	<i>1.3 U</i>
EPA 537 Modified	PFOS	See PFAS Combined	9.9	4.4	<i>2.6 U</i>	<i>2.6 U</i>	5.7 J	5.9	8.0
EPA 537 Modified	PFOA	See PFAS Combined	7.6	4.0	1.1 J	7.6	14 J	16	22
EPA 537 Modified	Five PFAS Summation ⁵	70	37	28	21	40	35 J	41	60

Notes:

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- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

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- J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW120-02	FAI18-TW120-01	FAI18-TW120-05	FAI18-TW120-06	FAI18-TW121-01	FAI18-TW122-01	FAI18-TW124-01
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42343-12	320-42343-11	320-42343-15	320-42343-16	320-42343-18	320-42343-19	320-42343-20
	Location ID:		TW120	TW120	TW120	TW120	TW121	TW122	TW124
	Sample Type:		Primary	Primary	Duplicate (FAI18-TW120-01)	Replicate (FAI18-TW120-01)	Primary	Primary	Primary
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		TW120	TW120	TW120	TW120	TW121	TW122a	TW124a
	Date Sampled:		8/13/2018	8/13/2018	8/13/2018	8/13/2018	8/15/2018	8/14/2018	8/14/2018
	Time Sampled:		13:56	13:01	13:03	13:27	12:47	16:40	14:36
	Depth Sampled (feet bws):		80.4	115.4	115.4	115.4	0.5	1.2	1.2
	Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	0.800 J	0.72 J	<i>0.94 U</i>	<i>0.88 U</i>	2.2 J	190	5.7
EPA 537 Modified	PFHpA	See PFAS Combined	<i>1.3 U</i>	<i>1.4 U</i>	<i>1.4 U</i>	<i>1.3 U</i>	5.7	30	9.4
EPA 537 Modified	PFHxS	See PFAS Combined	5.1	1.3 J	1.4 J	1.3 J	12	21	41
EPA 537 Modified	PFNA	See PFAS Combined	<i>1.3 U</i>	<i>1.4 U</i>	<i>1.4 U</i>	<i>1.3 U</i>	1.3 J	18	1.6 J
EPA 537 Modified	PFOS	See PFAS Combined	2.2 J	1.7 J	2.4 J	1.0 J	4.8 J	52	35
EPA 537 Modified	PFOA	See PFAS Combined	4.8	2.4	2.8	2.0	7.0	70	15
EPA 537 Modified	Five PFAS Summation ⁵	70	15	8.2	9.4	6.9	31	190	100

Notes:

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- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
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Chemical Data Summary:
Water Results

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW125-01	FAI18-TW126-01	FAI18-TW127-01	FAI18-TW128-01	FAI18-TW129-01	FAI18-TW130-01	FAI18-TW130-02
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42340-1	320-42340-2	320-42340-3	320-42340-4	320-42340-5	320-42340-6	320-42340-7
	Location ID:		TW125	TW126	TW127	TW128	TW129a	TW130	TW130
	Sample Type:		Primary	Primary	Primary	Primary	Primary	Primary	Duplicate (FAI18-TW130-01)
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		TW125	TW126a	TW127	TW128a	TW129a	TW130	TW130
	Date Sampled:		8/15/2018	8/15/2018	8/15/2018	8/16/2018	8/16/2018	8/18/2018	8/18/2018
	Time Sampled:		9:40	11:02	16:57	9:52	16:50	13:16	13:17
	Depth Sampled (feet bws):		1.6	2.1	1.5	2.4	1.7	1.3	1.3
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	1.2 J	1.7	4.2	2.5 J	40 J	290	430
EPA 537 Modified	PFHpA	See PFAS Combined	1.4 J	3.0	<i>1.3 U</i>	7.9 J	7.0J	120	130 J
EPA 537 Modified	PFHxS	See PFAS Combined	4.7	28	3.6	18 J	140 J	3,600	5,000 J
EPA 537 Modified	PFNA	See PFAS Combined	<i>1.8 U</i>	<i>1.3 U</i>	<i>1.3 U</i>	<i>1.3 UJ</i>	<i>1.3 UJ</i>	<i>1.2 U</i>	<i>1.3 U</i>
EPA 537 Modified	PFOS	See PFAS Combined	2.7 J	1.0 J	<i>2.5 U</i>	19 J	<i>2.6 UJ</i>	<i>2.5 U</i>	1.2 J
EPA 537 Modified	PFOA	See PFAS Combined	1.9 J	6.0	1.0 J	16 J	10 J	1,900	2,800 J
EPA 537 Modified	Five PFAS Summation ⁵	70	13	39	9.7	62 J	160 J	5,600	7,900 J

Notes:

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- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
- J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.
- UJ Flag: Not detected above LOD; however, the associated value is estimated. It is uncertain if the listed value is valid due to QC failures or sample handling/preservation anomalies.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW123-01	FAI18-TW202-01	FAI18-TW207-01	FAI18-TW207-03	FAI18-TW207-02	FAI18-TW208-01	FAI18-TW210-01
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-43995-1	320-43995-2	320-43995-3	320-43995-5	320-43995-4	320-43995-6	320-43995-7
	Location ID:		TW123a	TW202	TW207a	TW207a	TW207a	TW208	TW210
	Sample Type:		Primary	Primary	Primary	Duplicate (FAI18-TW207-01)	Primary	Primary	Primary
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		TW123a	TW202	TW207a	TW207a	TW207a	TW208	TW210
	Date Sampled:		10/4/2018	10/4/2018	10/5/2018	10/5/2018	10/5/2018	10/4/2018	10/4/2018
	Time Sampled:		11:10	12:33	19:52	19:54	18:55	18:05	13:47
	Depth Sampled (feet bws):		2.0	1.4	1.5	1.5	22.6	17.2	3.9
	Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	7.2	1.1 J	1,300 U	110 J-	1,300 U	41	21
EPA 537 Modified	PFHpA	See PFAS Combined	6.8	4.9	1,900 U, Q	16 J-	1,900 U, Q	5.4	5.3
EPA 537 Modified	PFHxS	See PFAS Combined	32	4.0	780 J	850 J	670 J	120	60
EPA 537 Modified	PFNA	See PFAS Combined	1.3 U	1.3 U	1,900 U, Q	100 Q	1,900 U, Q	1.3 U	0.71 J
EPA 537 Modified	PFOS	See PFAS Combined	14	3.5	3,800 U, Q	130 J-	3,800 U, Q	410	91
EPA 537 Modified	PFOA	See PFAS Combined	5.9	2.0	1,900 U, Q	180 J-	1,900 U, Q	18	8.6
EPA 537 Modified	Five PFAS Summation ⁵	70	60	16	10,000 J, Q	1300 J-	10,000 J, Q	550	170

Notes:

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- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

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- J- Flag: Result is estimated with a low bias due to QC failures or sample handling and preservation anomalies indicative of a low bias.
- Q Flag: Result has a serious deficiency due to elevated LOD and analyte presence/absence cannot be confirmed. Data should not be used for decision making.

Chemical Data Summary:
Water Results

R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW211-01	FAI18-TW216-01	FAI18-TW216-02	FAI18-TW218-01	FAI18-TW218-02	FAI18-TW219-01	FAI18-TW219-02
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-43995-8	320-43995-9	320-43995-10	320-43994-1	320-43994-2	320-43994-3	320-43994-4
	Location ID:		TW211	TW216	TW216	TW218a	TW218a	TW219	TW219
	Sample Type:		Primary	Primary	Duplicate (FAI18-TW216-01)	Primary	Primary	Primary	Primary
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Test Boring ID:		TW211	TW216	TW216	TW218a	TW218a	TW219	TW219
	Date Sampled:		10/4/2018	10/6/2018	10/6/2018	10/5/2018	10/5/2018	10/5/2018	10/5/2018
	Time Sampled:		15:10	9:14	9:16	10:10	9:11	13:09	12:00
	Depth Sampled (feet bws):		25.1	0.9	0.9	1.4	13.0	0.9	27.8
Units:		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	6.5	1,300 U	1,300 U	7.9	14	11	16.0
EPA 537 Modified	PFHpA	See PFAS Combined	3.2	1,900 U, Q	1,900 U, Q	0.79 J	1.8	3.2	4.70
EPA 537 Modified	PFHxS	See PFAS Combined	21	530 J	640 J	15	15	61	77
EPA 537 Modified	PFNA	See PFAS Combined	0.96 J	1,900 U, Q	1,900 U, Q	1.3 U	1.3 U	1.3 U	1.60 U
EPA 537 Modified	PFOS	See PFAS Combined	82	3,800 U, Q	3,800 U, Q	2.7 J	11	150	530
EPA 537 Modified	PFOA	See PFAS Combined	7.6	1,900 U, Q	1,900 U, Q	2.7	4.1	17	17.0
EPA 537 Modified	Five PFAS Summation ⁵	70	110	10,000 J, Q	10,000 J, Q	22	33	230	630

Notes:

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- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

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R&M Project No.: 2393.03	Field Sample ID:		FAI18-TW302-01	FAI18-TW302-02	FAI18-TW310-01	FAI18-TW310-02	FAI18-SW201-01		
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-43994-5	320-43994-6	320-43994-7	320-43994-8	320-43995-11		
	Location ID:		TW302a	TW302a	TW-310	TW-310	SW201		
	Sample Type:		Primary	Primary	Primary	Primary	Primary		
	Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Surface Water		
	Test Boring ID:		TW302a	TW302a	TW-310	TW-310	TW201		
	Date Sampled:		10/5/2018	10/5/2018	10/5/2018	10/5/2018	10/6/2018		
	Time Sampled:		17:36	16:49	15:10	14:25	10:12		
	Depth Sampled (feet bws):		2.8	19.3	1.7	23.2	0.5		
Units:		ng/L	ng/L	ng/L	ng/L	ng/L			
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	PFBS	2,000	5.3 J-	9.2 J-	14 J	92	0.95 UJ		
EPA 537 Modified	PFHpA	See PFAS Combined	33 J-	7.0 J-	10 J	21	1.4 UJ		
EPA 537 Modified	PFHxS	See PFAS Combined	2.0 J-	99 J-	130 J	710	1.6 J-		
EPA 537 Modified	PFNA	See PFAS Combined	1.3 UJ	1.3 UJ	1.3 J	1.3 U	1.4 UJ		
EPA 537 Modified	PFOS	See PFAS Combined	24 J-	100 J-	100 J	990	1.2 J-		
EPA 537 Modified	PFOA	See PFAS Combined	8.3 J-	27 J-	73 J	240	1.4 UJ		
EPA 537 Modified	Five PFAS Summation ⁵	70	80 J-	230 J-	310 J	2,000	7.0 J-		

Notes:

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- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

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- J- Flag: Result is estimated with a low bias due to QC failures or sample handling and preservation anomalies indicative of a low bias.
- Q Flag: Result has a serious deficiency due to elevated LOD and analyte presence/absence cannot be confirmed. Data should not be used for decision making.

R&M Project No.: 2393.03	Field Sample ID:		FAI18-WA-RS01	FAI18-WA-RS02	FAI18-WA-RS03	FAI18-WA-RS04	FAI18-WA-RS05		
Description: FAI PFAS Groundwater Characterization	TA-Sacramento Lab Sample ID:		320-42340-8	320-42340-9	320-42340-10	320-43994-9	320-43994-10		
	Location ID:		FAI	FAI	FAI	FAI	FAI		
	Sample Type:		Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank	Rinsate Blank		
	Matrix:		Water	Water	Water	Water	Water		
	Test Boring ID:		Not applicable	Not applicable	Not applicable	Not applicable	Not applicable		
	Date Sampled:		8/16/2018	8/17/2018	8/18/2018	10/4/2018	10/5/2018		
	Time Sampled:		9:15	15:10	10:55	16:22	11:15		
	Depth Sampled (feet bws):		Not applicable	Not applicable	Not applicable	Not applicable	Not applicable		
Units:		ng/L	ng/L	ng/L	ng/L	ng/L			
Analysis	Analyte	Action Level ¹	Results ^{2,3,4}						
EPA 537 Modified	Perfluorobutanesulfonic acid (PFBS)	2,000	<i>0.80 U</i>	<i>0.83 U</i>	<i>0.83 U</i>	<i>0.83 U</i>	<i>0.83 U</i>		
EPA 537 Modified	Perfluoroheptanoic acid (PFHpA)	See PFAS Combined	<i>1.2 U</i>	<i>1.2 U</i>	<i>1.3 U</i>	<i>1.2 U</i>	<i>1.2 U</i>		
EPA 537 Modified	Perfluorohexanesulfonic acid (PFHxS)	See PFAS Combined	0.57 J	<i>0.83 U</i>	0.35 J	<i>0.83 U</i>	0.34 J		
EPA 537 Modified	Perfluorononanoic acid (PFNA)	See PFAS Combined	<i>1.2 U</i>	<i>1.2 U</i>	<i>1.3 U</i>	<i>1.2 U</i>	<i>1.2 U</i>		
EPA 537 Modified	Perfluorooctanesulfonic acid (PFOS)	See PFAS Combined	<i>2.4 U</i>	1.1 J	<i>2.5 U</i>	<i>2.5 U</i>	<i>2.5 U</i>		
EPA 537 Modified	Perfluorooctanoic acid (PFOA)	See PFAS Combined	<i>1.2 U</i>	<i>1.2 U</i>	<i>1.3 U</i>	<i>1.2 U</i>	<i>1.2 U</i>		
EPA 537 Modified	Five PFAS Summation ⁵	70	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable		

Notes:

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- 4 Results with a detected concentration exceeding an ADEC action level are highlighted red and are in BOLD text.
- 5 Five PFAS Summation is calculated by adding PFHpA, PFHxS, PFNA, PFOS, and PFOA results, where non-detects are encountered the LOD is included in the summation.

Flagging Notes:

- U Flag: Result was not detected above the LOD.
- J Flag: Estimated concentration; analyte detected between DL and LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias.

APPENDIX H

DATA QUALITY ASSESSMENT

Date: 1/16/2019
Project name: Fairbanks International Airport PFAS Characterization
Laboratories: TestAmerica Laboratories, Inc. – Sacramento, California
Sample Delivery Groups: 320-42343-1, 320-42093-1, 320-42334-1, 320-42340-1, 320-43994-1, 320-43995-1
Prepared by: Alex Thompson
Title: Chemist
Senior review by: Rodney Guritz
Title: Principal Chemist
To: Mr. Christopher Fell
R&M Consultants, Inc.
9101 Vanguard Drive
Anchorage, AK 99507

Data Quality Assessment

This letter summarizes the findings of a data quality assessment (DQA) conducted by Arctic Data Services, LLC (ADS) on behalf of R&M Consultants, Inc. (R&M) for the above-referenced project data. Precision, accuracy, sensitivity, representativeness, comparability, and completeness of the data were evaluated by reviewing laboratory-supplied quality assurance/quality control (QA/QC) information as well as conducting independent QC checks on the data. A Stage 2A validation was conducted in general accordance with the ADS *Standard Operating Procedure for Stage 2A Data Validation* (2017). Stage 2A validation includes reviewing sample handling, custody, and sample-batch level QC information and applying data qualifiers to sample results affected by anomalies and QC failures, and summarizing the impacts to data quality. This validation meets the requirements of the Alaska Department of Environmental Conservation (ADEC) *Technical Memorandum on Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling* (March 2017). In the absence of project-specific control limits or measurement quality objectives (MQOs), QC-sample recoveries and relative percent differences (RPDs) were compared to laboratory control limits. Field-duplicate RPDs were compared to ADEC-recommended MQOs.

ADEC laboratory data review checklists were completed for each sample delivery group (SDG), and are attached to this DQA. Also attached is a tabular summary of data qualified in the course of our review (Table 1). All data qualifiers applied are defined in Table 1. The following sections provide a summary of our findings for each QA/QC element reviewed; anomalies that had no impact to data quality are discussed in the ADEC data review checklists, and are not further described herein.

Sample Analysis Summary

Analytical results for 80 surface water and groundwater samples (including eight QC field duplicates) and nine soil samples (including one QC field duplicate) were reviewed. The samples were submitted in six separate SDGs to TestAmerica Laboratories, Inc. in Sacramento, California for analysis of one or more of the following per- or poly-fluoro alkyl substances (PFAS) by modified EPA method 537:

- Perfluorobutanesulfonic acid (PFBS),
- Perfluorohexanesulfonic acid (PFHxS),
- Perfluoro-n-heptanoic acid (PFHpA),
- Perfluoro-n-nonanoic acid (PFNA),
- Perfluoro-n-octanoic acid (PFOA), and
- Perfluorooctanesulfonic acid (PFOS).

Sample Preservation, Handling, Custody, and Holding Times

Sample receipt forms (SRFs) were reviewed to check that samples were received in good condition, properly preserved, and within the required temperature range. Chain of custody (COC) forms were reviewed to confirm that custody was not breached during sample handling. Dates of sample collection, preparation, and analysis were compared to check that method holding times were not exceeded.

- **SDG 320-43994-1.** Samples FAI18-TW302-01 and FAI18-TW-302-02 were initially ran at an extreme dilution since the COC indicated samples might contain AFFF. The samples were reanalyzed undiluted, outside of holding times at the request of the client. Results were reported in a revised report from the laboratory. Detected results are qualified with a 'J-' flag, and non-detect results are qualified with a 'UJ' flag, indicating the results are estimated, biased low.
- **SDG 320-43995-1.** Samples FAI18-TW207-03 and FAI18-SW201-01 were reanalyzed outside of holding times; these samples were originally extracted at a dilution since the COC indicated samples might contain AFFF. The out-of-holding time results are used for final reporting. Detected results are qualified 'J-', and non-detect results are qualified 'UJ', indicating the results are estimated, biased low.

Analytical Sensitivity

Analytical sensitivity for soil sample results was evaluated by checking that limits of quantitation (LOQs) and limits of detection (LODs) were below the ADEC 18 AAC 75.341 Method Two Table B1 migration-to-groundwater soil cleanup levels (SCLs), where SCLs exist. Soil sample LODs were below SCLs for each non-detect result.

Analytical sensitivity for water sample results was evaluated by checking that the LOD for PFBS was below the ADEC action level (2018) of 2 µg/L and that summed LODs for the remaining PFAS analytes were below the ADEC combined action level (2018) of 0.07 µg/L. Sample results lacking adequate sensitivity are discussed below.

- **SDG 320-43995-1.** Samples FAI18-TW207-01, FAI18-TW207-02, FAI18-TW216-01, and FAI18-TW216-02 had LODs that exceeded ADEC action levels, due to being extracted at a dilution. Non-detect results for these samples are qualified with a 'Q' flag, tentatively rejected as unusable. In each case, these samples contained detected concentrations of PFHxS an order of magnitude above the ADEC combined action level, so impact to data usability was considered minor.

Method Blanks

The laboratory analyzed and reported a method blank (MB) for each preparatory batch, to check for laboratory-based sample contamination. Associated project-sample results were considered affected where the analyte was detected within 10 times the MB concentration.

There were no method blank detections affecting project sample data quality. See individual checklists for further details.

Laboratory Control Samples

The laboratories analyzed and reported laboratory control samples (LCSs) for each preparatory batch, to assess laboratory extraction efficiency and analytical accuracy. In some cases, LCS duplicates (LCSDs) were used to assess analytical precision. The laboratory did not report LCSDs for several batches (see checklists for details); for these batches, the laboratory presumably evaluated batch precision using a matrix spike and matrix spike duplicate (MS/MSD), which were not reported as they were not run on project samples. We have no measure of analytical precision for those batches lacking LCSD analysis. LCS and LCSD recovery information and LCS/LCSD RPD information (where available) were reviewed.

There were no LCS/LCSD recovery or RPD failures affecting project-sample data quality.

Matrix Spike Samples

MS/MSDs are typically submitted as additional volume for select project samples, and are used by the laboratory to assess possible matrix interference. They are also used to evaluate accuracy and precision. No project-specific MS/MSDs were required per the project work plan, and no additional volumes were submitted to the laboratory for MS/MSD analysis. The laboratory documented a number of MS/MSD recovery failures in case narratives, however, no MS/MSD QC information was reported and these failures were determined to have no impact on project data quality or usability.

Isotope Dilution Analyte Recovery

The modified EPA method 537 is an isotope dilution analysis method, using isotopically labelled PFAS analogs (isotope dilution analytes [IDAs]) to improve analytical accuracy for each sample result. Results are adjusted by essentially dividing the sample result by the recovery of the corresponding IDA, thereby correcting for inaccuracies in the extraction and analysis. However, there are limits to this correction, and IDA recovery limits are set to ensure the analysis is in control.

In each SDG for this project the laboratory experienced numerous IDA recovery failures. In most cases, where there was an IDA recovery failure the laboratory reanalyzed the sample. However, on more than one occasion, this was done outside of the extraction holding times. Each project sample reanalysis had comparable results to the original analysis. Where reanalysis was performed within holding times, the reanalysis result is retained for final reporting. Where reanalysis was performed outside of holding times, the original result with failing IDA recovery is retained for final reporting. In these cases, the affected result is flagged 'J', indicating the result is estimated with an unknown bias; see Table 1 for details. Refer to the *Summary of Data Quality Indicators* section of this assessment for a discussion of the impact to analytical accuracy and overall data usability.

Field Duplicates

A total of eight field duplicate groundwater and surface water samples, and a single soil field duplicate sample were collected and submitted blind to the laboratory. The field duplicate collection frequency met the required minimum frequency, in accordance with an ADEC approved work plan. Field duplicate samples are analyzed to evaluate overall precision. RPDs were calculated between field duplicate results; in the case where one result was not detected, the LOD was used in the RPD calculation.

Field-duplicate RPDs met the MQO of 30% for water matrix samples and the 50% MQO for soil samples, where calculable.

Other QC Anomalies

Other QC anomalies include instrument-level QC issues, and additional analytical or preparatory anomalies that may affect project-data quality.

For each SDG for this project, the laboratory documented a number of instrument-level QC failures; mostly from high analyte concentrations outside of calibration range. In most cases, the laboratory reanalyzed samples at a dilution, reporting results within calibration range. For instances where the data are reported outside of calibration range, results are qualified with a 'J' flag, indicating the results are estimated, with an unknown bias. This included PFHxS and PFOS results for samples FAI18-TW101-05 and FAI18-TW101-07. The impact to data usability is minimal, as results that exceed calibration range are orders of magnitude above ADEC action levels.

Additionally, a number of surface water and groundwater samples were received with particulates which caused clogging of the solid phase extraction (SPE) disc. No impact to data quality or usability is expected; IDA spikes are added to samples prior to extraction, and samples were analyzed with acceptable IDA recoveries, suggesting that adequately representative volumes were analyzed. The laboratory adjusted final reporting limits proportionally.

In SDG 320-43995-1, sample FAI18-TW207-03 was reanalyzed twice, following an initial extraction at dilution. Results between the second and third analysis were generally comparable, with the exception of PFNA results. PFNA was not detected in the second analysis, but was detected above the LOQ (at 100 ng/L) in the second analysis. Due to the poor comparability between analyses, PFNA results from the third analysis are reported, and have been qualified with a 'Q' flag, recommending the data for rejection.

Resolution of Results from Multiple Extractions/Analyses

Numerous samples were re-extracted and/or re-analyzed due to the various reasons documented above. These fell into several key categories, each of which are discussed below. Recommendations for final reporting values are provided.

- In cases where analytes were detected above the calibration range in the original analysis, and reanalyzed at a dilution and reported within the calibration range, the reanalysis results should be retained. In the few cases where the reanalysis was not within calibration range, the reanalysis results are reported and qualified accordingly.
- In cases where samples were reanalyzed within holding times due to IDA recovery failures in the original analysis, the reanalysis results should be retained.
- In cases where samples were reanalyzed outside of holding times due to IDA recovery failures in the original analysis, the original results should be retained. These results are qualified 'J' as discussed above.
- In cases where samples were extracted at a dilution due to the suspected presence of AFFF, then re-extracted without dilution, the reanalysis results should be retained (qualified as estimates with a low bias if this was done outside of holding times).
- In cases where results from multiple analyses are not comparable, the highest result is retained and qualified 'Q' as tentatively rejected.

Summary of Data Quality Indicators

The following sections summarize the findings of the above review with respect to the six data quality indicators: sensitivity, precision, accuracy, representativeness, comparability, and completeness. Note that our evaluation of representativeness, comparability, and completeness is limited to consideration of analytical data quality only. Assessment of data usability in the context of the project must be conducted by the project team as a whole, taking into account the data quality issues summarized herein, as well as overall project objectives.

Sensitivity

Sensitivity describes the ability of the sampling and analytical methodology to meet detection and/or quantitation limit objectives. Project sample reporting limits generally met project-specific requirements and relevant ADEC action levels for non-detect results, however severe sensitivity deficiencies were observed in a number of samples. Water samples labelled 'AFFF' on the COC were excessively diluted, resulting in high reporting limits. Summed LODs greatly exceeded the ADEC combined action levels for non-detect results for these samples. These results are qualified with a 'Q' flag, recommending the results for rejection, as the results cannot be used to rule out the potential presence of the analytes above action levels. As noted above, impact to data usability was minor for those four samples that contained PFHxS at an order of magnitude above the combined action limit. Overall analytical sensitivity was generally adequate for the purposes of this project, with the above taken into account.

Precision

Precision is a measure of the reproducibility of repetitive measurements. Precision was evaluated based on LCS/LCSD and field duplicate RPDs. LCSDs were not analyzed for a number of batches; however, field duplicate RPDs indicated adequate overall precision. There were no LCS/LCSD or field duplicate RPDs that exceeded project specific MQOs. Precision is deemed generally acceptable for the purposes of this project.

Accuracy

Accuracy is a measure of the correctness, or the closeness, between the true value and the quantity detected. Accuracy was evaluated based on analyte recoveries for laboratory QC samples and isotope dilution recoveries for project samples. Sample handling and preservation anomalies that may have impacted data accuracy are also taken into consideration.

There were no sample handling or preservation anomalies that affected analytical accuracy for this project. There were a number of QC anomalies that affected accuracy, including IDA recovery failures, results reported outside of calibration range, and results reported from analyses performed outside of holding times. Due to the degree of comparability between the results of multiple analyses, we conclude that there is minimal impact to data usability from each of these anomalies. However, the results should be considered estimated, and have been qualified with 'J' flags. Overall, analytical accuracy was deemed acceptable for purposes of this project.

Representativeness

Representativeness describes the degree to which data accurately and precisely represent site characteristics. Representativeness is affected by factors such as sample frequency and matrix or contaminant heterogeneity, as well as analytical performance (including sensitivity, accuracy, and precision) and sample cross-contamination.

Samples were collected in accordance with an approved work plan. No results were affected by blank contamination. Overall precision and accuracy were deemed adequate, with the exceptions noted above.

Additionally, the project team evaluated the potential for contaminant draw-down by sample tooling by comparing sample replicates collected following additional purging of temporary wells. This evaluation concluded that vertical cross-contamination did not affect data quality and that samples were representative of the depths they were collected from; refer to the report for details.

Overall representativeness is deemed acceptable for the purposes of this project.

Comparability

Comparability describes whether two data sets can be considered equivalent with respect to project goals. Comparability is affected by factors such as sampling methodology and analytical performance (including sensitivity, accuracy, and precision). Comparability was evaluated by checking that standard analytical methods were employed and analytical performance was acceptable. Due to variations in the implementation of EPA Method 537 across labs, PFAS data reported by one laboratory may lack comparability compared to PFAS data reported by another laboratory. Only one laboratory was used for this project.

A number of samples were reanalyzed at dilutions, due to outside of instrument calibration range errors or IDA recovery failures. The laboratory reported both sets of data, and results between analyses were mostly comparable, with the exception of PFNA results for sample FAI18-TW207-03 (see *Other QC Anomalies* above).

Data review findings generally support that the dataset is comparable; however, comparability should be evaluated by the project team considering sample collection methodology and historic results alongside data quality and analytical methodology.

Completeness

Completeness describes the amount of valid data obtained from the sampling event(s). It is calculated as the percentage of usable measurements compared to the total number of measurements. A total of 33 project-sample results were recommended for rejection during the course of our review, out of a total 626 reported results, for a calculated completeness of 95%.

Conclusions and Limitations

Precision, accuracy, representativeness, comparability, and completeness were deemed acceptable, and the data are usable for the purposes of this project, as qualified. Project sample results affected by the QC anomalies

described above have been flagged accordingly (Table 1). These results should be used with caution when comparing against cleanup levels or other decision-making criteria.

Our review was based solely on information provided by the analytical laboratory in the laboratory reports for the SDGs reviewed. We did not review instrument-level QC elements, such as calibration verification or internal standard response, except to the extent that the laboratory identified instrument-level anomalies in the case narrative. We did not conduct independent validation of the data (e.g. recalculating results based on instrument responses) or review any raw chemical data (e.g. chromatograms).

Attachments:

Table 1	Summary of Qualified Data
ADEC Laboratory Data Review Checklists:	TAL 320 –42093-1
	TAL 320 –42334-1
	TAL 320 –42340-1
	TAL 320 –42343-1
	TAL 320 –43994-1
	TAL 320 –43995-1

Table 1
Summary of Qualified Data
Fairbanks International Airport PFAS Groundwater Characterization
Data Quality Assessment

SDG	Sample ID	Matrix	Method	Analyte	Units	DL	LOD	LOQ	Result	Lab flags	Original Result	QC Flags	Note	Final Qualified Result
320-42334-1	FAI18-TW101-03	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.39	0.84	1.7	9.5		9.5	J	2	9.5 J
320-42334-1	FAI18-TW101-03	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.32	0.84	1.7	48		48	J	2	48 J
320-42334-1	FAI18-TW101-03	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.44	1.3	1.7	0.73	J M	0.73 J M	J	2	0.73 J
320-42334-1	FAI18-TW101-05	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	32	84	170	48000	E D	48000 E D	J	1	48000 J
320-42334-1	FAI18-TW101-05	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	93	250	340	420000	E D	420000 E D	J	1	420000 J
320-42334-1	FAI18-TW101-07	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	33	87	170	57000	E D	57000 E D	J	1	57000 J
320-42334-1	FAI18-TW101-07	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	95	260	350	660000	E D	660000 E D	J	1	660000 J
320-42334-1	FAI18-TW104-01	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.40	0.87	1.7	200	M	200 M	J	2	200 J
320-42334-1	FAI18-TW106-01	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.39	0.85	1.7	2.5	M	2.5 M	J	2	2.5 J
320-42334-1	FAI18-TW106-01	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.32	0.85	1.7	13		13	J	2	13 J
320-42334-1	FAI18-TW106-01	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.52	1.3	1.7		U M	1.3 U M	UJ	2	1.3 UJ
320-42334-1	FAI18-TW106-01	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.44	1.3	1.7		U M	1.3 U M	UJ	2	1.3 UJ
320-42334-1	FAI18-TW106-01	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.46	1.3	1.7	14	M	14 M	J	2	14 J
320-42334-1	FAI18-TW106-01	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	0.93	2.5	3.4	12		12	J	2	12 J
320-42340-1	FAI18-TH102-03	Soil	537M	Perfluoro-n-nonanoic acid (PFNA)	ug/kg	0.098	0.24	0.36	0.82		0.82	J	2	0.82 J
320-42340-1	FAI18-TH102-03	Soil	537M	Perfluorooctanesulfonic acid (PFOS)	ug/kg	29	60	120	3000	D E	3000 D E	J	1	3000 J
320-42340-1	FAI18-TW128-01	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.41	0.88	1.8	2.5	M	2.5 M	J	2	2.5 J
320-42340-1	FAI18-TW128-01	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.34	0.88	1.8	18		18	J	2	18 J
320-42340-1	FAI18-TW128-01	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.54	1.3	1.8	7.9		7.9	J	2	7.9 J
320-42340-1	FAI18-TW128-01	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.46	1.3	1.8		U M	1.3 U M	UJ	2	1.3 UJ
320-42340-1	FAI18-TW128-01	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.48	1.3	1.8	16	M	16 M	J	2	16 J
320-42340-1	FAI18-TW128-01	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	0.97	2.6	3.5	19		19	J	2	19 J
320-42340-1	FAI18-TW129-01	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.39	0.86	1.7	40		40	J	2	40 J
320-42340-1	FAI18-TW129-01	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.33	0.86	1.7	140		140	J	2	140 J
320-42340-1	FAI18-TW129-01	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.52	1.3	1.7	7.0	M	7.0 M	J	2	7.0 J
320-42340-1	FAI18-TW129-01	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.45	1.3	1.7		U	1.3 U	UJ	2	1.3 UJ
320-42340-1	FAI18-TW129-01	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.46	1.3	1.7	10		10	J	2	10 J
320-42340-1	FAI18-TW129-01	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	0.94	2.6	3.4		U M	2.6 U M	UJ	2	2.6 UJ
320-42340-1	FAI18-TW130-02	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	6.5	17	34	5000	D	5000 D	J	2	5000 J
320-42340-1	FAI18-TW130-02	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.53	1.3	1.7	130	M	130 M	J	2	130 J
320-42340-1	FAI18-TW130-02	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	9.3	26	34	2800	D	2800 D	J	2	2800 J
320-42340-1	FAI18-TW130-02	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	0.95	2.6	3.4	1.2	J M	1.2 J M	J	2	1.2 J
320-42343-1	FAI18-TW120-07	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.41	0.88	1.8	2.4		2.4	J	2	2.4 J

Table 1
Summary of Qualified Data
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SDG	Sample ID	Matrix	Method	Analyte	Units	DL	LOD	LOQ	Result	Lab flags	Original Result	QC Flags	Note	Final Qualified Result
320-42343-1	FAI18-TW120-07	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.34	0.88	1.8	13		13	J	2	13 J
320-42343-1	FAI18-TW120-07	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.54	1.3	1.8	1.0	J M	1.0 J M	J	2	1.0 J
320-42343-1	FAI18-TW120-07	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.46	1.3	1.8		U M	1.3 U M	UJ	2	1.3 UJ
320-42343-1	FAI18-TW120-07	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.48	1.3	1.8	14	M	14 M	J	2	14 J
320-42343-1	FAI18-TW120-07	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	0.97	2.6	3.5	5.7		5.7	J	2	5.7 J
320-43994-1	FAI18-TW302-01	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.41	0.88	1.8	5.3	H M	5.3 H M	J-	4	5.30 J-
320-43994-1	FAI18-TW302-01	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.33	0.88	1.8	33	H M	33 H M	J-	4	33.0 J-
320-43994-1	FAI18-TW302-01	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.54	1.3	1.8	2	H	2.0 H	J-	4	2.00 J-
320-43994-1	FAI18-TW302-01	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.46	1.3	1.8		U H M	1.3 U H M	UJ	4	1.30 UJ
320-43994-1	FAI18-TW302-01	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.48	1.3	1.8	8.3	H M	8.3 H M	J-	4	8.30 J-
320-43994-1	FAI18-TW302-01	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	0.97	2.6	3.5	24	H M	24 H M	J-	4	24.0 J-
320-43994-1	FAI18-TW302-02	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.39	0.85	1.7	9.2	H M	9.2 H M	J-	4	9.20 J-
320-43994-1	FAI18-TW302-02	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.32	0.85	1.7	99	H	99 H	J-	4	99.0 J-
320-43994-1	FAI18-TW302-02	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.52	1.3	1.7	7	H	7.0 H	J-	4	7.00 J-
320-43994-1	FAI18-TW302-02	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.44	1.3	1.7		U H M	1.3 U H M	UJ	4	1.30 UJ
320-43994-1	FAI18-TW302-02	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.46	1.3	1.7	27	H M	27 H M	J-	4	27.0 J-
320-43994-1	FAI18-TW302-02	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	0.93	2.5	3.4	100	H	100 H	J-	4	100 J-
320-43994-1	FAI18-TW310-01	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.4	0.87	1.7	14	M	14 M	J	2	14 J
320-43994-1	FAI18-TW310-01	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.33	0.87	1.7	130	M	130 M	J	2	130 J
320-43994-1	FAI18-TW310-01	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.53	1.3	1.7	10	M	10 M	J	2	10 J
320-43994-1	FAI18-TW310-01	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.45	1.3	1.7		U M	1.3 U M	UJ	2	1.3 UJ
320-43994-1	FAI18-TW310-01	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.47	1.3	1.7	73	M	73 M	J	2	73 J
320-43994-1	FAI18-TW310-01	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	0.96	2.6	3.5	100	M	100 M	J	2	100 J
320-43995-1	FAI18-TW207-01	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	760	1900	2500		U	1900 U	Q	3	1900 U, Q
320-43995-1	FAI18-TW207-01	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	650	1900	2500		U M	1900 U M	Q	3	1900 U, Q
320-43995-1	FAI18-TW207-01	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	680	1900	2500		U M	1900 U M	Q	3	1900 U, Q
320-43995-1	FAI18-TW207-01	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	1400	3800	5000		U M	3800 U M	Q	3	3800 U, Q
320-43995-1	FAI18-TW207-02	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	760	1900	2500		U	1900 U	Q	3	1900 U, Q
320-43995-1	FAI18-TW207-02	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	650	1900	2500		U	1900 U	Q	3	1900 U, Q
320-43995-1	FAI18-TW207-02	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	680	1900	2500		U	1900 U	Q	3	1900 U, Q
320-43995-1	FAI18-TW207-02	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	1400	3800	5000		U M	3800 U M	Q	3	3800 U, Q
320-43995-1	FAI18-TW216-01	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	760	1900	2500		U	1900 U	Q	3	1900 U, Q
320-43995-1	FAI18-TW216-01	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	650	1900	2500		U M	1900 U M	Q	3	1900 U, Q

Table 1
Summary of Qualified Data
Fairbanks International Airport PFAS Groundwater Characterization
Data Quality Assessment

SDG	Sample ID	Matrix	Method	Analyte	Units	DL	LOD	LOQ	Result	Lab flags	Original Result	QC Flags	Note	Final Qualified Result
320-43995-1	FAI18-TW216-01	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	680	1900	2500		U	1900 U	Q	3	1900 U, Q
320-43995-1	FAI18-TW216-01	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	1400	3800	5000		U	3800 U	Q	3	3800 U, Q
320-43995-1	FAI18-TW216-02	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	760	1900	2500		U	1900 U	Q	3	1900 U, Q
320-43995-1	FAI18-TW216-02	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	650	1900	2500		U	1900 U	Q	3	1900 U, Q
320-43995-1	FAI18-TW216-02	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	680	1900	2500		U M	1900 U M	Q	3	1900 U, Q
320-43995-1	FAI18-TW216-02	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	1400	3800	5000		U M	3800 U M	Q	3	3800 U, Q
320-43995-1	FAI18-TW207-03	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.43	NA	1.9	110	H	110 H	J-	4	110 J-
320-43995-1	FAI18-TW207-03	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.58	NA	1.9	16	H M	16 H M	J-	4	16 J-
320-43995-1	FAI18-TW207-03	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	2.5	NA	9.4	100	H D	100 H D	Q	5	100 Q
320-43995-1	FAI18-TW207-03	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.51	NA	1.9	180	H	180 H	J-	4	180 J-
320-43995-1	FAI18-TW207-03	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	1	NA	3.8	130	H M	130 H M	J-	4	130 J-
320-43995-1	FAI18-SW201-01	Water	537M	Perfluorobutanesulfonic acid (PFBS)	ng/L	0.43	0.95	1.9	0.95	U H	0.95 U H	UJ	4	0.95 UJ
320-43995-1	FAI18-SW201-01	Water	537M	Perfluorohexanesulfonic acid (PFHxS)	ng/L	0.36	NA	1.9	1.6	J H M	1.6 J H M	J-	4	1.6 J-
320-43995-1	FAI18-SW201-01	Water	537M	Perfluoro-n-heptanoic acid (PFHpA)	ng/L	0.58	1.4	1.9	1.4	U H M	1.4 U H M	UJ	4	1.4 UJ
320-43995-1	FAI18-SW201-01	Water	537M	Perfluoro-n-nonanoic acid (PFNA)	ng/L	0.49	1.4	1.9	1.4	U H M	1.4 U H M	UJ	4	1.4 UJ
320-43995-1	FAI18-SW201-01	Water	537M	Perfluoro-n-octanoic acid (PFOA)	ng/L	0.51	1.4	1.9	1.4	U H M	1.4 U H M	UJ	4	1.4 UJ
320-43995-1	FAI18-SW201-01	Water	537M	Perfluorooctanesulfonic acid (PFOS)	ng/L	1	NA	3.8	1.2	J H	1.2 J H	J-	4	1.2 J-

Table 1
Summary of Qualified Data
Fairbanks International Airport PFAS Groundwater Characterization
Data Quality Assessment

Notes

- | | | | |
|---|---|-------|---|
| 1 | Result is outside the instrument calibration range | ng/L | nanograms per liter |
| 2 | Isotope dilution analyte recovery failure | ug/kg | micrograms per kilogram |
| 3 | LOD exceeds ADEC action level by more than one order of magnitude | DL | Detection limit |
| 4 | Result is from analysis outside of holding times | LOD | Limit of Detection |
| 5 | Reanalyzed result is not comparable to results of previous analyses | LOQ | Limit of Quantitation |
| | | QC | quality control |
| | | SDG | sample delivery group |
| | | NA | LOD not listed as it was not reported in electronic data. |

Flag definitions

- J Estimated concentration; analyte was detected between the DL and the LOQ or was affected by QC failures or sample handling and preservation anomalies with an unknown bias (laboratory qualifier).
- UJ The analyte was not detected and is reported as less than the LOD; however, the associated numerical value is an estimate, and there is uncertainty whether the absence of detected analyte is valid at the listed value due to QC failures or sample handling and preservation anomalies.
- J- Estimated concentration (low bias); analyte was detected and was affected by QC failures or sample handling and preservation anomalies indicative of indicative of a potential high bias.
- Q The sample result was affected by serious deficiencies in the ability to meet published method or project QC criteria. The presence or absence of the analyte cannot be verified. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

Laboratory Data Review Checklist

Completed by:

Alex Thompson

Title:

Chemist

Date:

October 19, 2018

CS Report Name:

Fairbanks International Airport PFAS Groundwater Characterization

Report Date:

December 2018

Consultant Firm:

Arctic Data Services, LLC on behalf of R&M Consultants, LLC

Laboratory Name:

TestAmerica Laboratories, Inc. – Sacramento, CA

Laboratory Report Number:

320-42093-1

ADEC File Number:

100.38.277

Hazard Identification Number

26816

1. Laboratory

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

Yes No NA Comments:

All samples were received and analyzed by TestAmerica Laboratories, Inc. in Sacramento, CA.

- 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 Comments:

No samples were transferred to another lab.

2. Chain of Custody (COC)

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

Yes No NA Comments:

Project Name listed on the COC was incorrect; the correct project name was used by the laboratory in the report.

- b. Correct analyses requested?

Yes No NA Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No NA Comments:

A single cooler (Cooler ID: Gold) was received at 5.4 ° C.

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

Yes No NA Comments:

Samples were collected for PFAS analysis and do not require preservation.

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

Yes No NA Comments:

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 Comments:

There were no sample-receiving discrepancies.

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

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

Yes No NA Comments:

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

Yes No NA Comments:

The laboratory documented a number of QC anomalies that are addressed in the following sections of the checklist. Isotope dilution analyte (IDA) recovery failures are discussed in Section 6.c.

In some cases, the lab noted the presence of organic matter (insects, etc.) in surface water samples.

The laboratory noted the following modification of EPA Method 537 in the case narrative: “The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.”

The laboratory documented a number of instrument-level QC failures, mostly from high analyte concentrations outside of calibration range. In most cases, the laboratory reanalyzed samples at a dilution, reporting results within calibration range. Refer to the data quality assessment (DQA) for discussion of any exceptions.

A number of samples had particulates which caused clogging of the SPE extraction disc. Refer to the DQA for a discussion of data affected and impact to data usability.

Additionally, the laboratory reported that there was insufficient volume to perform an MS/MSD for prep batch 320-241604. No project specific MS/MSD was provided. Refer to the DQA for a discussion of overall QC sample frequency and requirements.

c. Were all corrective actions documented?

Yes No NA Comments:

Dilutions were performed on select samples where results exceeded the calibration range. Refer to DQA for additional discussion.

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

Comments:

The case narrative claims that IDA recovery failures have a minimal impact on data quality. No other conclusions are made in the case narrative, with regards to data usability.

5. Sample Results

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

Yes No NA Comments:

b. All applicable holding times met?

Yes No NA Comments:

c. All soils reported on a dry weight basis?

Yes No NA Comments:

No soil samples were submitted nor analyzed in this SDG.

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

Yes No NA Comments:

Summed LODs for PFHpA, PFHxS, PFOA, PFOS, PFNA were compared to the ADEC action level of 70 ng/L where these analytes were not detected. LODs for PFBS were compared to the ADEC action level of 2,000 ng/L. There were no non-detect results with an LOD or summed LODs exceeding the ADEC action level.

e. Data quality or usability affected?

Comments:

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 Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes No NA Comments:

No analytes were detected in method blanks associated with project samples.

iii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

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

Yes No NA Comments:

See above.

v. Data quality and usability affected?

Comments:

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 Comments:

An LCS/LCSD was performed and reported for each preparatory batch. Project-specific MS/MSDs were not required, per the project work plan.

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

Yes No NA Comments:

No metals/inorganic analyses were performed.

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 Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No NA Comments:

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

Comments:

No sample results were affected; see above.

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

Yes No NA Comments:

Please see above.

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

Comments:

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 Comments:

Since EPA Method 537 is an isotope dilution method, recovery of labeled isotopes of the target analytes are evaluated here.

- 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 Comments:

There was one IDA recovery failure; however the sample was reanalyzed at a dilution, with IDA recoveries within control limits. Results were comparable. Both results were reported by the laboratory; the result with acceptable IDA recoveries will be used for final reporting.

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

Yes No NA Comments:

Final reported results were not affected; see above. No data were qualified.

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

Comments:

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 Comments:

No volatile analysis was performed, so no trip blank was required or provided.

- 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 Comments:

NA; see above.

- iii. All results less than LOQ?

Yes No NA Comments:

NA; see above.

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

Comments:

No sample results were affected.

v. Data quality and usability affected?

Comments:

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

Comments:

Three duplicate sample pairs were submitted in this SDG. Sample FAI18-SW117 was submitted as a duplicate of sample FAI18-SW106. Sample FAI18-SW118 was submitted as a duplicate of sample FAI18-SW103. Sample FAI18-MW38 was submitted as a field duplicate of sample FAI18-MW15.

ii. Submitted blind to lab?

Yes No NA

Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs?

(Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $(R1-R2) / ((R1+R2)/2) \times 100$

Where R1 = Sample Concentration

R2 = Field Duplicate Concentration

Yes No NA

Comments:

All field duplicate RPDs were below the 30% MQOs for water samples, where calculable.

iv. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

Yes No NA

Comments:

Samples were collected using dedicated or disposable sampling equipment; no equipment blanks were required.

i. All results less than LOQ?

Yes No NA

Comments:

See above.

ii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

iii. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

a. Defined and appropriate?

Yes No NA

Comments:

The laboratory used the qualifier 'M' to indicate manually integrated compounds, an 'E' qualifier for results that exceeded instrument calibration range, and a 'D' flag to indicate results reported from a dilution. 'M' and 'D' flags will be removed for final reporting, as manual integrations and dilutions did not impact data quality. 'E' flags will be replaced, where appropriate, with 'J' flags to indicate results are estimated where reported from analyses outside calibration range.

Laboratory Data Review Checklist

Completed by:

Alex Thompson

Title:

Chemist

Date:

October 19, 2018

CS Report Name:

Fairbanks International Airport PFAS Groundwater Characterization

Report Date:

December 2018

Consultant Firm:

Arctic Data Services, LLC on behalf of R&M Consultants, LLC

Laboratory Name:

TestAmerica Laboratories, Inc. – Sacramento, CA

Laboratory Report Number:

320-42334-1

ADEC File Number:

100.38.277

Hazard Identification Number

26816

1. Laboratory

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

Yes No NA Comments:

All samples were received and analyzed by TestAmerica Laboratories, Inc. in Sacramento, CA.

- 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 Comments:

No samples were transferred to another lab.

2. Chain of Custody (COC)

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

Yes No NA Comments:

- b. Correct analyses requested?

Yes No NA Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No NA Comments:

A single cooler (Cooler ID: Silver) was received at 4.5° C.

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

Yes No NA Comments:

Samples were collected for PFAS analysis and do not require preservation.

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

Yes No NA Comments:

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 Comments:

There were no sample-receiving discrepancies.

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

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

Yes No NA Comments:

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

Yes No NA Comments:

The laboratory documented a number of QC anomalies that are addressed in the following sections of the checklist. Isotope dilution analyte (IDA) recovery failures are discussed in Section 6.c. A number of samples were reanalyzed outside of holding times due to initial IDA recovery failures. In some cases, the lab noted the presence of organic matter (insects, etc.) in surface water samples. The laboratory noted the following modification of EPA Method 537 in the case narrative: “The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.”

The laboratory documented a number of instrument-level QC failures, mostly from high analyte concentrations outside of calibration range. In most cases, the laboratory reanalyzed samples at a dilution, reporting results within calibration range. Refer to the data quality assessment (DQA) for discussion of any exceptions.

A number of samples had particulates which caused clogging of the SPE extraction disc. Refer to the DQA for a discussion of data affected and impact to data usability.

Additionally, the laboratory reported that there was insufficient volume to perform an MS/MSD for prep batches 320-243894 and 320-242249. No project specific MS/MSD was provided. Refer to the DQA for a discussion of overall QC sample frequency and requirements.

c. Were all corrective actions documented?

Yes No NA Comments:

Dilutions were performed on select samples where results exceeded the calibration range. Refer to DQA for additional discussion.

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

Comments:

The case narrative claims that IDA recovery failures have a minimal impact on data quality. No other conclusions are made in the case narrative, with regards to data usability.

5. Sample Results

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

Yes No NA Comments:

b. All applicable holding times met?

Yes No NA Comments:

A number of samples were reanalyzed outside holding times due to IDA recovery failures (see 6.c.). However, final data are reported from analyses performed within holding times, so no data were affected.

c. All soils reported on a dry weight basis?

Yes No NA Comments:

No soil samples were submitted nor analyzed in this SDG.

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

Yes No NA Comments:

Summed LODs for PFHpA, PFHxS, PFOA, PFOS, PFNA were compared to the ADEC action level of 70 ng/L where these analytes were not detected. LODs for PFBS were compared to the ADEC action level of 2,000 ng/L. There were no non-detect results with an LOD or summed LODs exceeding the ADEC action level.

e. Data quality or usability affected?

Comments:

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 Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes No NA Comments:

No analytes were detected in method blanks associated with project samples.

iii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

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

Yes No NA Comments:

See above.

v. Data quality and usability affected?

Comments:

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 Comments:

An LCS/LCSD was performed and reported for each preparatory batch. Project-specific MS/MSDs were not required, per the project work plan.

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

Yes No NA Comments:

No metals/inorganic analyses were performed.

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 Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No NA Comments:

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

Comments:

No sample results were affected; see above.

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

Yes No NA Comments:

Please see above.

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

Comments:

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 Comments:

Since EPA Method 537 is an isotope dilution method, recovery of labeled isotopes of the target analytes are evaluated here.

- 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 Comments:

There were numerous IDA recovery failures. In each case, affected samples were reanalyzed at a dilution, with IDA recoveries within control limits. Results were comparable. Both results were reported by the laboratory; the result with acceptable IDA recoveries will be used for final reporting, except for in cases where the sample was analyzed outside of holding times. In these cases, the original results with IDA failures were reported, and the data qualified accordingly. Refer to the DQA for details.

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

Yes No NA Comments:

Results affected by IDA recovery failures are qualified 'J' as estimated with an unknown bias. Refer to Table 1 of the DQA for a list of affected sample results.

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

Comments:

Data quality was affected as described above. Impact to data usability is considered minimal, as results from additional runs at dilutions were comparable, with IDA recoveries within laboratory limits.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)?

Yes No NA Comments:

No volatile analysis was performed, so no trip blank was required or provided.

- 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 Comments:

NA; see above.

- iii. All results less than LOQ?

Yes No NA Comments:

NA; see above.

iv. If above LOQ, what samples are affected?

Comments:

No sample results were affected.

v. Data quality and usability affected?

Comments:

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

Comments:

Sample FAI18-TW101-06 was submitted as a duplicate of sample FAI18-TW101-1.

ii. Submitted blind to lab?

Yes No NA

Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$RPD (\%) = \text{Absolute value of: } (R1-R2) / ((R1+R2)/2) \times 100$

Where R1 = Sample Concentration

R2 = Field Duplicate Concentration

Yes No NA

Comments:

All field duplicate RPDs were below the 30% MQOs, where calculable.

iv. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

Yes No NA

Comments:

Samples were collected using dedicated or disposable sampling equipment; no equipment blanks were required.

i. All results less than LOQ?

Yes No NA

Comments:

See above.

ii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

iii. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

a. Defined and appropriate?

Yes No NA

Comments:

The laboratory used the qualifier 'M' to indicate manually integrated compounds, an 'E' qualifier for results that exceeded instrument calibration range, and a 'D' flag to indicate results reported from a dilution. 'M' and 'D' flags will be removed for final reporting, as manual integrations and dilutions did not impact data quality. 'E' flags will be replaced, where appropriate, with 'J' flags to indicate results are estimated where reported from analyses outside calibration range.

Laboratory Data Review Checklist

Completed by:

Alex Thompson

Title:

Chemist

Date:

October 19, 2018

CS Report Name:

Fairbanks International Airport PFAS Groundwater Characterization

Report Date:

December 2018

Consultant Firm:

Arctic Data Services, LLC on behalf of R&M Consultants, LLC

Laboratory Name:

TestAmerica Laboratories, Inc. – Sacramento, CA

Laboratory Report Number:

320-42340-1

ADEC File Number:

100.38.277

Hazard Identification Number

26816

1. Laboratory

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

Yes No NA Comments:

All samples were received and analyzed by TestAmerica Laboratories, Inc. in Sacramento, CA.

- 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 Comments:

No samples were transferred to another laboratory.

2. Chain of Custody (COC)

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

Yes No NA Comments:

- b. Correct analyses requested?

Yes No NA Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No NA Comments:

A single cooler (Cooler ID: Lead) was received at 1.9° C.

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

Yes No NA Comments:

Samples were collected for PFAS analysis and do not require preservation.

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

Yes No NA Comments:

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 Comments:

There were no sample-receiving discrepancies.

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

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

Yes No NA Comments:

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

Yes No NA Comments:

The laboratory documented a number of QC anomalies that are addressed in the following sections of the checklist. Isotope dilution analyte (IDA) recovery failures are discussed in Section 6.c. A number of samples were reanalyzed outside of holding times due to initial IDA recovery failures.

In some cases, the lab noted the presence of organic matter (insects, etc.) in surface water samples.

The laboratory noted the following modification of EPA Method 537 in the case narrative: “The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.”

The laboratory documented a number of instrument-level QC failures, mostly from high analyte concentrations outside of calibration range. In most cases, the laboratory reanalyzed samples at a dilution, reporting results within calibration range. Refer to the data quality assessment (DQA) for discussion of any exceptions.

A number of samples had particulates which caused clogging of the SPE extraction disc. Refer to the DQA for a discussion of data affected and impact to data usability.

Additionally, the laboratory reported that there was insufficient volume to perform an MS/MSD for prep batch 320-244127. No project specific MS/MSD was provided. Refer to the DQA for a discussion of overall QC sample frequency and requirements.

c. Were all corrective actions documented?

Yes No NA Comments:

Dilutions were performed on select samples where results exceeded the calibration range, or in response to IDA recovery failures. Refer to DQA for additional discussion.

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

Comments:

The case narrative claims that IDA recovery failures have a minimal impact on data quality. No other conclusions are made in the case narrative, with regards to data usability.

5. Sample Results

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

Yes No NA Comments:

b. All applicable holding times met?

Yes No NA Comments:

A number of samples were reanalyzed outside holding times due to IDA recovery failures (see 6.c.). However, final data are reported from analyses performed within holding times, so no data were affected.

c. All soils reported on a dry weight basis?

Yes No NA Comments:

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

Yes No NA Comments:

Soil sample LODs were compared to ADEC 18 AAC 75.341 Method Two Table B1 migration to groundwater soil cleanup levels (SCLs).

For groundwater samples, summed LODs for PFHpA, PFHxS, PFOA, PFOS, PFNA were compared to the ADEC action level of 70 ng/L. LODs for PFBS were compared to the ADEC action level of 2,000 ng/L.

No LODs exceeded SCLs or action levels for non-detect results.

e. Data quality or usability affected?

Comments:

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

Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes No NA

Comments:

No analytes were detected in method blanks associated with project samples.

iii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

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

Yes No NA

Comments:

See above.

v. Data quality and usability affected?

Comments:

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

Comments:

An LCS/LCSD was performed and reported for each preparatory batch. Project-specific MS/MSDs were not required, per the project work plan.

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

Yes No NA Comments:

No metals/inorganic analyses were performed.

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 Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No NA Comments:

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

Comments:

No sample results were affected; see above.

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

Yes No NA Comments:

Please see above.

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

Comments:

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 Comments:

Since EPA Method 537 is an isotope dilution method, recovery of labeled isotopes of the target analytes are evaluated here.

- 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 Comments:

There were numerous IDA recovery failures. In each case, affected samples were reanalyzed at a dilution, with IDA recoveries within control limits. Results were comparable. Both results were reported by the laboratory; the result with acceptable IDA recoveries will be used for final reporting, except for in cases where the sample was analyzed outside of holding times. In these cases, the original results with IDA failures were reported, and the data qualified accordingly. Refer to the DQA for details.

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

Yes No NA Comments:

Results affected by IDA recovery failures are qualified 'J' as estimated with an unknown bias. Refer to Table 1 of the DQA for a list of affected sample results.

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

Comments:

Data quality was affected as described above. Impact to data usability is considered minimal, as results from additional runs at dilutions were comparable, with IDA recoveries within laboratory limits.

- d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)?

Yes No NA Comments:

No volatile analysis was performed, so no trip blank was required or provided.

- 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 Comments:

NA; see above.

- iii. All results less than LOQ?

Yes No NA Comments:

NA; see above.

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

Comments:

No sample results were affected.

v. Data quality and usability affected?

Comments:

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

Comments:

Sample FAI18-TH102-02 was submitted as a duplicate of sample FAI18-TH102-01. Sample FAI18-TW130-02 was submitted as a field duplicate of sample FAI17-TW130-01.

ii. Submitted blind to lab?

Yes No NA

Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs?

(Recommended: 30% water, 50% soil)

$RPD (\%) = \text{Absolute value of: } (R1-R2) / ((R1+R2)/2) \times 100$

Where R1 = Sample Concentration

R2 = Field Duplicate Concentration

Yes No NA

Comments:

All field duplicate RPDs were below the 30% MQO for groundwater samples and the 50% MQO for soil samples, where calculable.

iv. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

Yes No NA

Comments:

Samples were collected using dedicated or disposable sampling equipment; no equipment blanks were required.

i. All results less than LOQ?

Yes No NA

Comments:

See above.

ii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

iii. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

a. Defined and appropriate?

Yes No NA

Comments:

The laboratory used the qualifier 'M' to indicate manually integrated compounds, an 'E' qualifier for results that exceeded instrument calibration range, and a 'D' flag to indicate results reported from a dilution. 'M' and 'D' flags will be removed for final reporting, as manual integrations and dilutions did not impact data quality. 'E' flags will be replaced, where appropriate, with 'J' flags to indicate results are estimated where reported from analyses outside calibration range.

Laboratory Data Review Checklist

Completed by:

Alex Thompson

Title:

Chemist

Date:

October 31, 2018

CS Report Name:

Fairbanks International Airport PFAS Groundwater Characterization

Report Date:

December 2018

Consultant Firm:

Arctic Data Services, LLC on behalf of R&M Consultants, LLC

Laboratory Name:

TestAmerica Laboratories, Inc. – Sacramento, CA

Laboratory Report Number:

320-42343-1

ADEC File Number:

100.38.277

Hazard Identification Number

26816

1. Laboratory

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

Yes No NA Comments:

All samples were received and analyzed by TestAmerica Laboratories, Inc. in Sacramento, CA.

- 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 Comments:

No samples were transferred to another lab.

2. Chain of Custody (COC)

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

Yes No NA Comments:

- b. Correct analyses requested?

Yes No NA Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No NA Comments:

A single cooler (Cooler ID: Zinc) was received at 2.1° C.

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

Yes No NA Comments:

Samples were collected for PFAS analysis and do not require preservation.

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

Yes No NA Comments:

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 Comments:

There were no sample-receiving discrepancies.

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

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

Yes No NA Comments:

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

Yes No NA Comments:

The laboratory documented a number of QC anomalies that are addressed in the following sections of the checklist. Isotope dilution analyte (IDA) recovery failures are discussed in Section 6.c. A number of samples were reanalyzed outside of holding times due to initial IDA recovery failures.

In some cases, the lab noted the presence of organic matter (insects, etc.) in surface water samples.

The laboratory noted the following modification of EPA Method 537 in the case narrative: “The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.”

The laboratory documented a number of instrument-level QC failures, mostly from high analyte concentrations outside of calibration range. In most cases, the laboratory reanalyzed samples at a dilution, reporting results within calibration range. Refer to the data quality assessment (DQA) for discussion of any exceptions.

A number of samples had particulates which caused clogging of the SPE extraction disc. Refer to the DQA for a discussion of data affected and impact to data usability.

Additionally, the laboratory reported that there was insufficient volume to perform an MS/MSD for prep batch 320-242800 and batch 320-242292. No project specific MS/MSD was provided. Refer to the DQA for a discussion of overall QC sample frequency and requirements.

c. Were all corrective actions documented?

Yes No NA Comments:

Dilutions were performed on select samples where results exceeded the calibration range. Select samples were reanalyzed outside of holding time to confirm data following IDA recovery failures. Refer to DQA for additional discussion.

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

Comments:

The case narrative claims that IDA recovery failures have a minimal impact on data quality. They noted that matrix interference was suspected for the MS/MSDs with recovery failures (see 6.b.). No other conclusions are made in the case narrative, with regards to data usability.

5. Sample Results

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

Yes No NA Comments:

b. All applicable holding times met?

Yes No NA Comments:

A number of samples were reanalyzed outside holding times due to IDA recovery failures (see 6.c.). However, final data are reported from analyses performed within holding times, so no data were affected.

c. All soils reported on a dry weight basis?

Yes No NA Comments:

No soil samples were submitted in this SDG.

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

Yes No NA Comments:

Summed LODs for PFHpA, PFHxS, PFOA, PFOS, PFNA were compared to the ADEC action level of 70 ng/L where these analytes were not detected. LODs for PFBS were compared to the ADEC action level of 2,000 ng/L. There were no non-detect results with an LOD or summed LODs exceeding the ADEC action level.

e. Data quality or usability affected?

Comments:

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

Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes No NA

Comments:

No analytes were detected in method blanks associated with project samples.

iii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

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

Yes No NA

Comments:

See above.

Data quality and usability affected?

Comments:

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

Comments:

An LCS/LCSD was performed and reported for each preparatory batch. Project-specific MS/MSDs were not required, per the project work plan.

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

Yes No NA Comments:

No metals/inorganic analyses were performed.

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 Comments:

The laboratory noted MS/MSD recovery failures in the case narrative, however MS/MSDs were not reported on the QC pages of the laboratory report and presumably the MS/MSD parent samples were not associated with this project (TestAmerica does not report MS/MSDs for non-project samples).

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 Comments:

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

Comments:

No sample results were affected; see above.

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

Yes No NA Comments:

Please see above.

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

Comments:

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 Comments:

Since EPA Method 537 is an isotope dilution method, recovery of labeled isotopes of the target analytes are evaluated here.

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 Comments:

There were numerous IDA recovery failures. In each case, affected samples were reanalyzed at a dilution, with IDA recoveries within control limits. Results were comparable. Both results were reported by the laboratory; the result with acceptable IDA recoveries will be used for final reporting, except for in cases where the sample was analyzed outside of holding times. In these cases, the original results with IDA failures were reported, and the data qualified accordingly. Refer to the DQA for details.

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

Yes No NA Comments:

Results affected by IDA recovery failures are qualified 'J' as estimated with an unknown bias. Refer to Table 1 of the DQA for a list of affected sample results.

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

Comments:

Data quality was affected as described above. Impact to data usability is considered minimal, as results from additional runs at dilutions were comparable, with IDA recoveries within laboratory limits.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)?

Yes No NA Comments:

No volatile analysis was performed, so no trip blank was required or provided.

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 Comments:

NA; see above.

iii. All results less than LOQ?

Yes No NA Comments:

NA; see above.

iv. If above LOQ, what samples are affected?

Comments:

No sample results were affected.

v. Data quality and usability affected?

Comments:

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 Comments:

Sample FAI18-TW120-05 was submitted as a field duplicate of sample FAI17-TW120-01.

ii. Submitted blind to lab?

Yes No NA Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $(R1-R2) / ((R1+R2)/2) \times 100$

Where R1 = Sample Concentration

R2 = Field Duplicate Concentration

Yes No NA Comments:

All field duplicate RPDs were below the 30% MQO for groundwater samples, where calculable.

iv. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

Yes No NA

Comments:

Samples were collected using dedicated or disposable sampling equipment; no equipment blanks were required.

- i. All results less than LOQ?

Yes No NA

Comments:

See above.

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

Comments:

No sample results were affected; see above.

- iii. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

- a. Defined and appropriate?

Yes No NA

Comments:

The laboratory used the qualifier 'M' to indicate manually integrated compounds, an 'E' qualifier for results that exceeded instrument calibration range, and a 'D' flag to indicate results reported from a dilution. 'M' and 'D' flags will be removed for final reporting, as manual integrations and dilutions did not impact data quality. 'E' flags will be replaced, where appropriate, with 'J' flags to indicate results are estimated where reported from analyses outside calibration range.

Laboratory Data Review Checklist

Completed by:

Alex Thompson

Title:

Chemist

Date:

October 31, 2018

CS Report Name:

Fairbanks International Airport PFAS Groundwater Characterization

Report Date:

December 2018

Consultant Firm:

Arctic Data Services, LLC on behalf of R&M Consultants, LLC

Laboratory Name:

TestAmerica Laboratories, Inc. – Sacramento, CA

Laboratory Report Number:

320-43394-1

ADEC File Number:

100.38.277

Hazard Identification Number

26816

1. Laboratory

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

Yes No NA Comments:

All samples were received and analyzed by TestAmerica Laboratories, Inc. in Sacramento, CA.

- 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 Comments:

No samples were transferred to another lab.

2. Chain of Custody (COC)

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

Yes No NA Comments:

- b. Correct analyses requested?

Yes No NA Comments:

Two samples had a remark “AFFF” as free product was suspected to be present in these samples. A revised report was provided by the laboratory following reanalysis of samples FAI18-TW302-01 and FAI18-TW302-02 at the request of the client. The samples were originally analyzed at an extreme dilution as they were labeled “AFFF” on the COC.

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No NA Comments:

A single cooler (Cooler ID: Barium) was received 3.5° C.

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

Yes No NA Comments:

Samples were collected for PFAS analysis and do not require preservation.

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

Yes No NA Comments:

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 Comments:

There were no sample-receiving discrepancies.

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

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

Yes No NA Comments:

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

Yes No NA Comments:

The laboratory documented a number of QC anomalies that are addressed in the following sections of the checklist. Isotope dilution analyte (IDA) recovery failures are discussed in Section 6.c. A number of samples were reanalyzed outside of holding times due to initial IDA recovery failures.

The laboratory noted the following modification of EPA Method 537 in the case narrative: “The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.”

The laboratory documented a number of instrument-level QC failures, mostly from high analyte concentrations outside of calibration range. In most cases, the laboratory reanalyzed samples at a dilution, reporting results within calibration range. Refer to the data quality assessment (DQA) for discussion of any exceptions.

A number of samples had particulates which caused clogging of the SPE extraction disc. Refer to the DQA for a discussion of data affected and impact to data usability.

The laboratory extracted a smaller volume of the two samples noted to contain “AFFF,” so reporting limits were elevated (see 5.d.).

Additionally, the laboratory reported that there was insufficient volume to perform an MS/MSD for prep batch 320-253281 and batch 320-253390. No project specific MS/MSD was provided. Refer to the DQA for a discussion of overall QC sample frequency and requirements.

c. Were all corrective actions documented?

Yes No NA Comments:

Dilutions were performed on select samples where results exceeded the calibration range. Select samples were reanalyzed outside of holding time to confirm data following IDA recovery failures. Refer to DQA for additional discussion.

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

Comments:

The case narrative claims that IDA recovery failures have a minimal impact on data quality. They noted that matrix interference was suspected for the MS/MSDs with recovery failures (see 6.b.). No other conclusions are made in the case narrative, with regards to data usability.

5. Sample Results

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

Yes No NA Comments:

b. All applicable holding times met?

Yes No NA Comments:

A number of samples were reanalyzed outside holding times due to IDA recovery failures (see 6.c.). However, final data are reported from analyses performed within holding times, so no data were affected.
Additionally, samples FAI18-TW302-01 and FAI18-TW302-02 were reanalyzed outside of holding times. The client requested the two samples be reanalyzed due to the samples being run at extreme dilutions for the initial analysis. Results from the reanalysis performed outside of holding times were reported by the laboratory in a revised report. Detected results are qualified with a 'J-' flag, and non-detect results are qualified with a 'UJ' flag, indicating the results are estimated, biased low.

c. All soils reported on a dry weight basis?

Yes No NA Comments:

No soil samples were submitted in this SDG.

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

Yes No NA Comments:

Summed LODs for PFHpA, PFHxS, PFOA, PFOS, PFNA were compared to the ADEC action level of 70 ng/L. LODs for PFBS were compared to the ADEC action level of 2,000 ng/L.

e. Data quality or usability affected?

Comments:

Non-detect results where the LOD or summed LODs exceed action levels should not be used to rule out the potential presence of the analyte(s) above action levels.

6. QC Samples

a. Method Blank

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

Yes No NA

Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes No NA

Comments:

However, PFHxS and PFOS were detected below the LOQ in the method blank associated with prep batch 320-256135. PFHxS and PFOS were detected in the associated project sample FAI18-TW310-01, at concentrations greater than ten times the method blank concentration, so no data are considered affected.

iii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

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

Yes No NA

Comments:

See above.

Data quality and usability affected?

Comments:

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 Comments:

An LCS was analyzed and reported for each preparatory batch. An LCSD was also analyzed and reported for each prep batch, with the exception of batch 253015, containing a single project sample. We have no measure of analytical precision for this batch. Field duplicate RPDs indicated adequate overall precision so data quality was not considered affected. Project-specific MS/MSDs were not required, per the project work plan.

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

Yes No NA Comments:

No metals/inorganic analyses were performed.

- 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 Comments:

The laboratory noted MS/MSD recovery failures in the case narrative, however MS/MSDs were not reported on the QC pages of the laboratory report and presumably the MS/MSD parent samples were not associated with this project (TestAmerica does not report MS/MSDs for non-project samples).

- 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 Comments:

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

Comments:

No sample results were affected; see above.

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

Yes No NA Comments:

Please see above.

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

Comments:

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

Comments:

Since EPA Method 537 is an isotope dilution method, recovery of isotope dilution analytes (IDAs) are evaluated here.

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

Comments:

All six IDAs were recovered slightly below control limits for sample FAI18-TW310-01. This sample was reanalyzed at a dilution, outside of holding times, with IDA recoveries within control limits. Results were comparable. The original, in-holding-time results are selected for final reporting, and are qualified 'J' as estimated with an unknown bias (non-detects qualified 'UJ', due to the IDA recovery failures.

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

Yes No NA

Comments:

See above.

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

Comments:

Data quality was affected as described above. Impact to data usability is considered minimal, as results from additional runs at dilutions were comparable, with IDA recoveries within laboratory limits.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)?

Yes No NA

Comments:

No volatile analysis was performed, so no trip blank was required or provided.

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 Comments:

NA; see above.

iii. All results less than LOQ?

Yes No NA Comments:

NA; see above.

iv. If above LOQ, what samples are affected?

Comments:

No sample results were affected.

v. Data quality and usability affected?

Comments:

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 Comments:

Duplicate samples were collected in accordance with an ADEC approved work plan and a field duplicate was not provided in this SDG. See the DQA for a discussion of overall field duplicate collection requirements.

ii. Submitted blind to lab?

Yes No NA Comments:

NA; see above.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $(R1-R2) / ((R1+R2)/2) \times 100$

Where R1 = Sample Concentration

R2 = Field Duplicate Concentration

Yes No NA Comments:

NA; see above.

iv. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

Yes No NA

Comments:

Samples were collected using dedicated or disposable sampling equipment; no equipment blanks were required.

i. All results less than LOQ?

Yes No NA

Comments:

See above.

ii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

iii. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

a. Defined and appropriate?

Yes No NA

Comments:

The laboratory used the qualifier 'M' to indicate manually integrated compounds, an 'E' qualifier for results that exceeded instrument calibration range, and a 'D' flag to indicate results reported from a dilution. 'M' and 'D' flags will be removed for final reporting, as manual integrations and dilutions did not impact data quality. 'E' flags will be replaced, where appropriate, with 'J' flags to indicate results are estimated where reported from analyses outside calibration range. Refer to the DQA for details.

Laboratory Data Review Checklist

Completed by:

Alex Thompson

Title:

Chemist

Date:

October 31, 2018

CS Report Name:

Fairbanks International Airport PFAS Groundwater Characterization

Report Date:

December 2018

Consultant Firm:

Arctic Data Services, LLC on behalf of R&M Consultants, LLC

Laboratory Name:

TestAmerica Laboratories, Inc. – Sacramento, CA

Laboratory Report Number:

320-43395-1

ADEC File Number:

100.38.277

Hazard Identification Number

26816

1. Laboratory

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

Yes No NA Comments:

All samples were received and analyzed by TestAmerica Laboratories, Inc. in Sacramento, CA.

- 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 Comments:

No samples were transferred to another lab.

2. Chain of Custody (COC)

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

Yes No NA Comments:

- b. Correct analyses requested?

Yes No NA Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No NA Comments:

A single cooler was received 5.2° C.

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

Yes No NA Comments:

Samples were collected for PFAS analysis and do not require preservation.

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

Yes No NA Comments:

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 Comments:

There were no sample-receiving discrepancies.

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

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

Yes No NA Comments:

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

Yes No NA Comments:

The laboratory documented a number of QC anomalies that are addressed in the following sections of the checklist. Isotope dilution analyte (IDA) recovery failures are discussed in Section 6.c. A number of samples were reanalyzed outside of holding times due to initial IDA recovery failures.

In some cases, the lab noted the presence of organic matter (insects, etc.) in surface water samples.

The laboratory noted the following modification of EPA Method 537 in the case narrative: “The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.”

The laboratory documented a number of instrument-level QC failures, mostly from high analyte concentrations outside of calibration range. In most cases, the laboratory reanalyzed samples at a dilution, reporting results within calibration range. Refer to the data quality assessment (DQA) for discussion of any exceptions.

A number of samples had particulates which caused clogging of the SPE extraction disc. Refer to the DQA for a discussion of data affected and impact to data usability.

Additionally, the laboratory reported that there was insufficient volume to perform an MS/MSD for prep batch 320-253385. No project specific MS/MSD was provided. Refer to the DQA for a discussion of overall QC sample frequency and requirements.

c. Were all corrective actions documented?

Yes No NA Comments:

Dilutions were performed on select samples where results exceeded the calibration range. Select samples were reanalyzed outside of holding time to confirm data following IDA recovery failures. Refer to DQA for additional discussion.

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

Comments:

The case narrative claims that IDA recovery failures have a minimal impact on data quality. They noted that matrix interference was suspected for the MS/MSDs with recovery failures (see 6.b.). No other conclusions are made in the case narrative, with regards to data usability.

5. Sample Results

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

Yes No NA Comments:

b. All applicable holding times met?

Yes No NA Comments:

A number of samples were reanalyzed outside holding times due to IDA recovery failures (see 6.c.). Samples FAI18-TW207-03 and FAI18-SW201-01 were reanalyzed outside of holding times; these samples were originally extracted at a dilution since the COC indicated samples might contain AFFF. The out-of-holding time results are recommended for final reporting for results that were not detected at a dilution. Detected results are qualified 'J-' as estimated, biased low, and non-detect results are qualified 'UJ' as estimated, with uncertainty in the absence of the analyte.

c. All soils reported on a dry weight basis?

Yes No NA Comments:

No soil samples were submitted in this SDG.

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

Yes No NA Comments:

Summed LODs for PFHpA, PFHxS, PFOA, PFOS, PFNA were compared to the ADEC action level of 70 ng/L. LODs for PFBS were compared to the ADEC action level of 2,000 ng/L. Samples FAI18-TW207-01, FAI18-TW207-02, FAI18-TW216-01, and FAI18-TW216-02 (labelled as 'AFFF') had elevated reporting limits that exceeded action levels, due to being run at a dilution. Non-detect results for these samples are qualified with an 'Q' flag, tentatively rejected as unusable.

e. Data quality or usability affected?

Comments:

Non-detect results where the LOD or summed LODs exceed action levels should not be used to rule out the potential presence of the analyte(s) above action levels. In each case, these samples contained detected concentrations of PFHxS an order of magnitude above the combined action level, so impact to data usability was minor.

6. QC Samples

a. Method Blank

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

Yes No NA Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes No NA Comments:

However, PFHxS was detected below the LOQ in the 537M analysis method blank associated with prep batch 320-258300.

iii. If above LOQ, what samples are affected?

Comments:

Associated project sample results are considered affected if they are detected within 10x the concentration of the method blank. PFHxS was detected in the associated project sample FAI18-TW207-03, at a concentration over 10x the method blank concentration, so no data are considered affected.

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

Yes No NA Comments:

No samples were affected; see above.

Data quality and usability affected?

Comments:

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 Comments:

An LCS/LCSD was performed and reported for each preparatory batch. An LCSD was also analyzed and reported for each prep batch, with the exception of batch 253015, containing five project samples. We have no measure of analytical precision for this batch. Field duplicate RPDs indicated adequate overall precision so data quality was not considered affected. Project-specific MS/MSDs were not required, per the project work plan.

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

Yes No NA Comments:

No metals/inorganic analyses were performed.

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 Comments:

The laboratory noted MS/MSD recovery failures in the case narrative, however MS/MSDs were not reported on the QC pages of the laboratory report and presumably the MS/MSD parent samples were not associated with this project (TestAmerica does not report MS/MSDs for non-project samples).

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 Comments:

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

Comments:

No sample results were affected; see above.

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

Yes No NA

Comments:

Please see above.

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

Comments:

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

Comments:

Since EPA Method 537 is an isotope dilution method, recovery of isotope dilution analytes (IDAs) are evaluated here.

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

Comments:

There were no reported IDA recovery failures.

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

Yes No NA

Comments:

No samples were affected; see above.

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

Comments:

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 Comments:

No volatile analysis was performed, so no trip blank was required or provided.

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 Comments:

NA; see above.

iii. All results less than LOQ?

Yes No NA Comments:

NA; see above.

iv. If above LOQ, what samples are affected?

Comments:

No sample results were affected.

v. Data quality and usability affected?

Comments:

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 Comments:

Sample FAI18-TW201-03 was submitted as a field duplicate of sample FAI18-TW207-01.
Sample FAI18-TW216-02 was submitted as a field duplicate of FAI18-TW216-01.

ii. Submitted blind to lab?

Yes No NA Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } (R1-R2) / ((R1+R2)/2) \times 100$$

Where R1 = Sample Concentration

R2 = Field Duplicate Concentration

Yes No NA Comments:

All field duplicate RPDs were below the 30% MQO for groundwater samples, where calculable.

iv. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

Yes No NA Comments:

Samples were collected using dedicated or disposable sampling equipment; no equipment blanks were required.

i. All results less than LOQ?

Yes No NA Comments:

See above.

ii. If above LOQ, what samples are affected?

Comments:

No sample results were affected; see above.

iii. Data quality and usability affected?

Comments:

Data quality and usability were not affected.

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

a. Defined and appropriate?

Yes No NA

Comments:

The laboratory used the qualifier 'M' to indicate manually integrated compounds, an 'E' qualifier for results that exceeded instrument calibration range, and a 'D' flag to indicate results reported from a dilution. 'M' and 'D' flags will be removed for final reporting, as manual integrations and dilutions did not impact data quality. 'E' flags will be replaced, where appropriate, with 'J' flags to indicate results are estimated where reported from analyses outside calibration range.

APPENDIX I
LEVEL 2 LABORATORY DATA REPORTS

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: 320-42093-1
Client Project/Site: FAI PFAS
Revision: 1

For:
R&M Consultants, Inc
9101 Vanguard Drive
Anchorage, Alaska 99507

Attn: Christopher Fell



Authorized for release by:
9/20/2018 12:57:15 PM

Jill Kellmann, Manager of Project Management
(916)374-4402
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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: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
M	Manual integrated compound.
E	Result exceeded calibration range.
D	The reported value is from a dilution.

Glossary

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

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Job ID: 320-42093-1

Laboratory: TestAmerica Sacramento

Narrative

Revision - September 20, 2018

Report revised to include a single page of results per sample per client request.

Receipt

The samples were received on 8/14/2018 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.4° C.

LCMS

Method(s) EPA 537 (Mod), EPA 537(Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) EPA 537 (Mod): The concentration of Perfluorobutanesulfonic acid (PFBS) and Perfluorohexanesulfonic acid (PFHxS) associated with the following sample exceeded the instrument calibration range: FAI18-MW30R (320-42093-21). These analytes have been qualified; however, the peaks did not saturate the instrument detector. The sample was diluted with results within calibration range. Both sets of data were reported.

Method(s) EPA 537 (Mod): Results for sample FAI18-MW30R (320-42093-21) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method(s) EPA 537 (Mod): The Isotope Dilution Analyte (IDA) recoveries are below the method recommended limit for 13C2 PFHxA in the following sample: FAI18-MW30R (320-42093-21). This sample was re-analyzed at dilution with IDA recoveries within control limits. Both sets of data are reported. 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.

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

Organic Prep

Method(s) 3535: The following samples: FAI18-SW101 (320-42093-1), FAI18-SW102 (320-42093-2), FAI18-SW103 (320-42093-3), FAI18-SW104 (320-42093-4), FAI18-SW105 (320-42093-5), FAI18-SW106 (320-42093-6), FAI18-SW107 (320-42093-7), FAI18-SW108 (320-42093-8), FAI18-SW109 (320-42093-9), FAI18-SW110 (320-42093-10), FAI18-SW111 (320-42093-11) and FAI18-SW112 (320-42093-12) in preparation batch 320-241570 were observed to be a light yellow color prior to extraction.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-241604.

Method(s) 3535: The following sample: FAI18-SW105 (320-42093-5) in preparation batch 320-241570 was observed to contain live insects prior to extraction.

Method(s) 3535: The following samples FAI18-MW18 (320-42093-20) and FAI18-MW30R (320-42093-21) had non-settleable particulate matter which plugged the SPE extraction disk. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field of the prep batch. The "Tare Weight" recorded is the weight of the emptied bottle.

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

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW101

Lab Sample ID: 320-42093-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.61	J M	1.7	0.31	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW102

Lab Sample ID: 320-42093-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.54	J M	1.6	0.31	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW103

Lab Sample ID: 320-42093-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.54	J M	1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW104

Lab Sample ID: 320-42093-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.1		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	39	M	1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.0		1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	14	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	210		3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	3.8		1.7	0.44	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW105

Lab Sample ID: 320-42093-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.8	M	1.7	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	13	M	1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3		1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	4.3	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	31		3.3	0.92	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.89	J M	1.7	0.43	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW106

Lab Sample ID: 320-42093-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	61		1.6	0.37	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	250	M	1.6	0.31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	10		1.6	0.49	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	96	M	1.6	0.43	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	230		3.2	0.89	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW107

Lab Sample ID: 320-42093-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14		1.6	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	82	M	1.6	0.31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.3		1.6	0.50	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	9.1	M	1.6	0.44	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	130		3.3	0.90	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	1.1	J	1.6	0.42	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW108

Lab Sample ID: 320-42093-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.0		1.7	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	37	M	1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.5		1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	7.2	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	55		3.3	0.92	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.55	J	1.7	0.43	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW109

Lab Sample ID: 320-42093-9

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.94	J M	1.6	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.5	M	1.6	0.31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.86	J	1.6	0.50	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	3.1	M	1.6	0.44	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.0	J M	3.3	0.90	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW110

Lab Sample ID: 320-42093-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.2	J	1.7	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.6	M	1.7	0.31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.96	J M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	11		3.3	0.91	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW111

Lab Sample ID: 320-42093-11

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.59	J	1.6	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.0	M	1.6	0.31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.86	J M	1.6	0.44	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.4	M	3.3	0.91	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW112

Lab Sample ID: 320-42093-12

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.1	J M	1.7	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.9	M	1.7	0.31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.5	J	1.7	0.50	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.8	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.9	M	3.3	0.91	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW113

Lab Sample ID: 320-42093-13

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.5		1.8	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.9		1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.74	J	1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.4	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.5	J M	3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW114

Lab Sample ID: 320-42093-14

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.82	J M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.5		1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.83	J	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.1	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.9	J	3.4	0.95	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW115

Lab Sample ID: 320-42093-15

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.58	J	1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW116

Lab Sample ID: 320-42093-16

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.67	J	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW117

Lab Sample ID: 320-42093-17

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	65		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	230		1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	11	M	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	99	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	230		3.4	0.94	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW118

Lab Sample ID: 320-42093-18

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.53	J M	1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-MW15

Lab Sample ID: 320-42093-19

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.9		1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	20		1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.2	J M	1.8	0.55	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	4.2	M	1.8	0.49	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.7		3.6	0.99	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-MW18

Lab Sample ID: 320-42093-20

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	13	M	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	54		1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	11	M	1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	47	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	22		3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-MW30R

Lab Sample ID: 320-42093-21

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-MW30R (Continued)

Lab Sample ID: 320-42093-21

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	860	E	1.8	0.42	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	960	M E	1.8	0.35	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	120	M	1.8	0.56	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	310		1.8	0.49	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.4	M	3.6	1.0	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	1300	D	36	8.4	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1200	D M	36	6.9	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	110	D M	36	11	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	330	D M	36	9.8	ng/L	20		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-MW34

Lab Sample ID: 320-42093-22

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.1		1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	67	M	1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.6		1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	25	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	50		3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-MW38

Lab Sample ID: 320-42093-23

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.0	M	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	20		1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.3	J M	1.8	0.55	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	4.6	M	1.8	0.49	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	10		3.6	0.99	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW101

Lab Sample ID: 320-42093-1

Date Collected: 08/11/18 09:22

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.83	U	1.7	0.38	ng/L		08/23/18 08:51	08/26/18 00:10	1
Perfluorohexanesulfonic acid (PFHxS)	0.61	J M	1.7	0.31	ng/L		08/23/18 08:51	08/26/18 00:10	1
Perfluoroheptanoic acid (PFHpA)	1.2	U	1.7	0.50	ng/L		08/23/18 08:51	08/26/18 00:10	1
Perfluorooctanoic acid (PFOA)	1.2	U M	1.7	0.45	ng/L		08/23/18 08:51	08/26/18 00:10	1
Perfluorooctanesulfonic acid (PFOS)	2.5	U M	3.3	0.91	ng/L		08/23/18 08:51	08/26/18 00:10	1
Perfluorononanoic acid (PFNA)	1.2	U	1.7	0.43	ng/L		08/23/18 08:51	08/26/18 00:10	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	84		50 - 150				08/23/18 08:51	08/26/18 00:10	1
13C4-PFHpA	94		50 - 150				08/23/18 08:51	08/26/18 00:10	1
13C4 PFOA	89		50 - 150				08/23/18 08:51	08/26/18 00:10	1
13C3-PFBS	82		50 - 150				08/23/18 08:51	08/26/18 00:10	1
13C4 PFOS	79		50 - 150				08/23/18 08:51	08/26/18 00:10	1
13C5 PFNA	86		50 - 150				08/23/18 08:51	08/26/18 00:10	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW102

Lab Sample ID: 320-42093-2

Date Collected: 08/10/18 17:24

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.81	U	1.6	0.37	ng/L		08/23/18 08:51	08/26/18 00:18	1
Perfluorohexanesulfonic acid (PFHxS)	0.54	J M	1.6	0.31	ng/L		08/23/18 08:51	08/26/18 00:18	1
Perfluoroheptanoic acid (PFHpA)	1.2	U	1.6	0.49	ng/L		08/23/18 08:51	08/26/18 00:18	1
Perfluorooctanoic acid (PFOA)	1.2	U	1.6	0.44	ng/L		08/23/18 08:51	08/26/18 00:18	1
Perfluorooctanesulfonic acid (PFOS)	2.4	U M	3.2	0.89	ng/L		08/23/18 08:51	08/26/18 00:18	1
Perfluorononanoic acid (PFNA)	1.2	U	1.6	0.42	ng/L		08/23/18 08:51	08/26/18 00:18	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	82		50 - 150	08/23/18 08:51	08/26/18 00:18	1
13C4-PFHpA	96		50 - 150	08/23/18 08:51	08/26/18 00:18	1
13C4 PFOA	86		50 - 150	08/23/18 08:51	08/26/18 00:18	1
13C3-PFBS	76		50 - 150	08/23/18 08:51	08/26/18 00:18	1
13C4 PFOS	71		50 - 150	08/23/18 08:51	08/26/18 00:18	1
13C5 PFNA	82		50 - 150	08/23/18 08:51	08/26/18 00:18	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW103

Lab Sample ID: 320-42093-3

Date Collected: 08/10/18 15:45

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.84	U	1.7	0.38	ng/L		08/23/18 08:51	08/26/18 00:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.54	J M	1.7	0.32	ng/L		08/23/18 08:51	08/26/18 00:26	1
Perfluoroheptanoic acid (PFHpA)	1.3	U	1.7	0.51	ng/L		08/23/18 08:51	08/26/18 00:26	1
Perfluorooctanoic acid (PFOA)	1.3	U	1.7	0.45	ng/L		08/23/18 08:51	08/26/18 00:26	1
Perfluorooctanesulfonic acid (PFOS)	2.5	U M	3.3	0.92	ng/L		08/23/18 08:51	08/26/18 00:26	1
Perfluorononanoic acid (PFNA)	1.3	U	1.7	0.44	ng/L		08/23/18 08:51	08/26/18 00:26	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	82		50 - 150				08/23/18 08:51	08/26/18 00:26	1
13C4-PFHpA	93		50 - 150				08/23/18 08:51	08/26/18 00:26	1
13C4 PFOA	88		50 - 150				08/23/18 08:51	08/26/18 00:26	1
13C3-PFBS	83		50 - 150				08/23/18 08:51	08/26/18 00:26	1
13C4 PFOS	75		50 - 150				08/23/18 08:51	08/26/18 00:26	1
13C5 PFNA	81		50 - 150				08/23/18 08:51	08/26/18 00:26	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW104

Lab Sample ID: 320-42093-4

Date Collected: 08/10/18 12:07

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.1		1.7	0.39	ng/L		08/23/18 08:51	08/26/18 00:33	1
Perfluorohexanesulfonic acid (PFHxS)	39	M	1.7	0.32	ng/L		08/23/18 08:51	08/26/18 00:33	1
Perfluoroheptanoic acid (PFHpA)	9.0		1.7	0.51	ng/L		08/23/18 08:51	08/26/18 00:33	1
Perfluorooctanoic acid (PFOA)	14	M	1.7	0.46	ng/L		08/23/18 08:51	08/26/18 00:33	1
Perfluorooctanesulfonic acid (PFOS)	210		3.4	0.93	ng/L		08/23/18 08:51	08/26/18 00:33	1
Perfluorononanoic acid (PFNA)	3.8		1.7	0.44	ng/L		08/23/18 08:51	08/26/18 00:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	78		50 - 150				08/23/18 08:51	08/26/18 00:33	1
13C4-PFHpa	92		50 - 150				08/23/18 08:51	08/26/18 00:33	1
13C4 PFOA	89		50 - 150				08/23/18 08:51	08/26/18 00:33	1
13C3-PFBS	78		50 - 150				08/23/18 08:51	08/26/18 00:33	1
13C4 PFOS	73		50 - 150				08/23/18 08:51	08/26/18 00:33	1
13C5 PFNA	81		50 - 150				08/23/18 08:51	08/26/18 00:33	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW105

Lab Sample ID: 320-42093-5

Date Collected: 08/10/18 12:23

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.8	M	1.7	0.38	ng/L		08/23/18 08:51	08/26/18 00:41	1
Perfluorohexanesulfonic acid (PFHxS)	13	M	1.7	0.32	ng/L		08/23/18 08:51	08/26/18 00:41	1
Perfluoroheptanoic acid (PFHpA)	2.3		1.7	0.51	ng/L		08/23/18 08:51	08/26/18 00:41	1
Perfluorooctanoic acid (PFOA)	4.3	M	1.7	0.45	ng/L		08/23/18 08:51	08/26/18 00:41	1
Perfluorooctanesulfonic acid (PFOS)	31		3.3	0.92	ng/L		08/23/18 08:51	08/26/18 00:41	1
Perfluorononanoic acid (PFNA)	0.89	J M	1.7	0.43	ng/L		08/23/18 08:51	08/26/18 00:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	74		50 - 150				08/23/18 08:51	08/26/18 00:41	1
13C4-PFHpA	88		50 - 150				08/23/18 08:51	08/26/18 00:41	1
13C4 PFOA	86		50 - 150				08/23/18 08:51	08/26/18 00:41	1
13C3-PFBS	70		50 - 150				08/23/18 08:51	08/26/18 00:41	1
13C4 PFOS	71		50 - 150				08/23/18 08:51	08/26/18 00:41	1
13C5 PFNA	81		50 - 150				08/23/18 08:51	08/26/18 00:41	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW106

Lab Sample ID: 320-42093-6

Date Collected: 08/10/18 15:25

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	61		1.6	0.37	ng/L		08/23/18 08:51	08/26/18 00:49	1
Perfluorohexanesulfonic acid (PFHxS)	250	M	1.6	0.31	ng/L		08/23/18 08:51	08/26/18 00:49	1
Perfluoroheptanoic acid (PFHpA)	10		1.6	0.49	ng/L		08/23/18 08:51	08/26/18 00:49	1
Perfluorooctanoic acid (PFOA)	96	M	1.6	0.43	ng/L		08/23/18 08:51	08/26/18 00:49	1
Perfluorooctanesulfonic acid (PFOS)	230		3.2	0.89	ng/L		08/23/18 08:51	08/26/18 00:49	1
Perfluorononanoic acid (PFNA)	1.2	U M	1.6	0.42	ng/L		08/23/18 08:51	08/26/18 00:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	81		50 - 150				08/23/18 08:51	08/26/18 00:49	1
13C4-PFHpA	96		50 - 150				08/23/18 08:51	08/26/18 00:49	1
13C4 PFOA	92		50 - 150				08/23/18 08:51	08/26/18 00:49	1
13C3-PFBS	88		50 - 150				08/23/18 08:51	08/26/18 00:49	1
13C4 PFOS	73		50 - 150				08/23/18 08:51	08/26/18 00:49	1
13C5 PFNA	81		50 - 150				08/23/18 08:51	08/26/18 00:49	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW107

Lab Sample ID: 320-42093-7

Date Collected: 08/10/18 13:20

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14		1.6	0.38	ng/L		08/23/18 08:51	08/26/18 00:57	1
Perfluorohexanesulfonic acid (PFHxS)	82	M	1.6	0.31	ng/L		08/23/18 08:51	08/26/18 00:57	1
Perfluoroheptanoic acid (PFHpA)	9.3		1.6	0.50	ng/L		08/23/18 08:51	08/26/18 00:57	1
Perfluorooctanoic acid (PFOA)	9.1	M	1.6	0.44	ng/L		08/23/18 08:51	08/26/18 00:57	1
Perfluorooctanesulfonic acid (PFOS)	130		3.3	0.90	ng/L		08/23/18 08:51	08/26/18 00:57	1
Perfluorononanoic acid (PFNA)	1.1	J	1.6	0.42	ng/L		08/23/18 08:51	08/26/18 00:57	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	77		50 - 150				08/23/18 08:51	08/26/18 00:57	1
13C4-PFHpA	93		50 - 150				08/23/18 08:51	08/26/18 00:57	1
13C4 PFOA	86		50 - 150				08/23/18 08:51	08/26/18 00:57	1
13C3-PFBS	82		50 - 150				08/23/18 08:51	08/26/18 00:57	1
13C4 PFOS	67		50 - 150				08/23/18 08:51	08/26/18 00:57	1
13C5 PFNA	77		50 - 150				08/23/18 08:51	08/26/18 00:57	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW108

Lab Sample ID: 320-42093-8

Date Collected: 08/10/18 13:44

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.0		1.7	0.38	ng/L		08/23/18 08:51	08/26/18 01:05	1
Perfluorohexanesulfonic acid (PFHxS)	37	M	1.7	0.32	ng/L		08/23/18 08:51	08/26/18 01:05	1
Perfluoroheptanoic acid (PFHpA)	3.5		1.7	0.51	ng/L		08/23/18 08:51	08/26/18 01:05	1
Perfluorooctanoic acid (PFOA)	7.2	M	1.7	0.45	ng/L		08/23/18 08:51	08/26/18 01:05	1
Perfluorooctanesulfonic acid (PFOS)	55		3.3	0.92	ng/L		08/23/18 08:51	08/26/18 01:05	1
Perfluorononanoic acid (PFNA)	0.55	J	1.7	0.43	ng/L		08/23/18 08:51	08/26/18 01:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	77		50 - 150				08/23/18 08:51	08/26/18 01:05	1
13C4-PFHpA	94		50 - 150				08/23/18 08:51	08/26/18 01:05	1
13C4 PFOA	90		50 - 150				08/23/18 08:51	08/26/18 01:05	1
13C3-PFBS	81		50 - 150				08/23/18 08:51	08/26/18 01:05	1
13C4 PFOS	70		50 - 150				08/23/18 08:51	08/26/18 01:05	1
13C5 PFNA	81		50 - 150				08/23/18 08:51	08/26/18 01:05	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW109

Lab Sample ID: 320-42093-9

Date Collected: 08/10/18 11:42

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.94	J M	1.6	0.38	ng/L		08/23/18 08:51	08/26/18 01:20	1
Perfluorohexanesulfonic acid (PFHxS)	4.5	M	1.6	0.31	ng/L		08/23/18 08:51	08/26/18 01:20	1
Perfluoroheptanoic acid (PFHpA)	0.86	J	1.6	0.50	ng/L		08/23/18 08:51	08/26/18 01:20	1
Perfluorooctanoic acid (PFOA)	3.1	M	1.6	0.44	ng/L		08/23/18 08:51	08/26/18 01:20	1
Perfluorooctanesulfonic acid (PFOS)	3.0	J M	3.3	0.90	ng/L		08/23/18 08:51	08/26/18 01:20	1
Perfluorononanoic acid (PFNA)	1.2	U	1.6	0.43	ng/L		08/23/18 08:51	08/26/18 01:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	79		50 - 150				08/23/18 08:51	08/26/18 01:20	1
13C4-PFHpA	89		50 - 150				08/23/18 08:51	08/26/18 01:20	1
13C4 PFOA	84		50 - 150				08/23/18 08:51	08/26/18 01:20	1
13C3-PFBS	80		50 - 150				08/23/18 08:51	08/26/18 01:20	1
13C4 PFOS	69		50 - 150				08/23/18 08:51	08/26/18 01:20	1
13C5 PFNA	76		50 - 150				08/23/18 08:51	08/26/18 01:20	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW110

Lab Sample ID: 320-42093-10

Date Collected: 08/10/18 10:37

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.2	J	1.7	0.38	ng/L		08/23/18 08:51	08/26/18 01:28	1
Perfluorohexanesulfonic acid (PFHxS)	7.6	M	1.7	0.31	ng/L		08/23/18 08:51	08/26/18 01:28	1
Perfluoroheptanoic acid (PFHpA)	1.2	U	1.7	0.50	ng/L		08/23/18 08:51	08/26/18 01:28	1
Perfluorooctanoic acid (PFOA)	0.96	J M	1.7	0.45	ng/L		08/23/18 08:51	08/26/18 01:28	1
Perfluorooctanesulfonic acid (PFOS)	11		3.3	0.91	ng/L		08/23/18 08:51	08/26/18 01:28	1
Perfluorononanoic acid (PFNA)	1.2	U	1.7	0.43	ng/L		08/23/18 08:51	08/26/18 01:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	91		50 - 150				08/23/18 08:51	08/26/18 01:28	1
13C4-PFHpa	105		50 - 150				08/23/18 08:51	08/26/18 01:28	1
13C4 PFOA	96		50 - 150				08/23/18 08:51	08/26/18 01:28	1
13C3-PFBS	86		50 - 150				08/23/18 08:51	08/26/18 01:28	1
13C4 PFOS	84		50 - 150				08/23/18 08:51	08/26/18 01:28	1
13C5 PFNA	89		50 - 150				08/23/18 08:51	08/26/18 01:28	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW111

Lab Sample ID: 320-42093-11

Date Collected: 08/10/18 10:28

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.59	J	1.6	0.38	ng/L		08/23/18 08:51	08/26/18 01:36	1
Perfluorohexanesulfonic acid (PFHxS)	3.0	M	1.6	0.31	ng/L		08/23/18 08:51	08/26/18 01:36	1
Perfluoroheptanoic acid (PFHpA)	1.2	U	1.6	0.50	ng/L		08/23/18 08:51	08/26/18 01:36	1
Perfluorooctanoic acid (PFOA)	0.86	J M	1.6	0.44	ng/L		08/23/18 08:51	08/26/18 01:36	1
Perfluorooctanesulfonic acid (PFOS)	4.4	M	3.3	0.91	ng/L		08/23/18 08:51	08/26/18 01:36	1
Perfluorononanoic acid (PFNA)	1.2	U	1.6	0.43	ng/L		08/23/18 08:51	08/26/18 01:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	80		50 - 150				08/23/18 08:51	08/26/18 01:36	1
13C4-PFHpa	94		50 - 150				08/23/18 08:51	08/26/18 01:36	1
13C4 PFOA	89		50 - 150				08/23/18 08:51	08/26/18 01:36	1
13C3-PFBS	85		50 - 150				08/23/18 08:51	08/26/18 01:36	1
13C4 PFOS	73		50 - 150				08/23/18 08:51	08/26/18 01:36	1
13C5 PFNA	80		50 - 150				08/23/18 08:51	08/26/18 01:36	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW112

Lab Sample ID: 320-42093-12

Date Collected: 08/10/18 10:59

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.1	J M	1.7	0.38	ng/L		08/23/18 08:51	08/26/18 01:44	1
Perfluorohexanesulfonic acid (PFHxS)	2.9	M	1.7	0.31	ng/L		08/23/18 08:51	08/26/18 01:44	1
Perfluoroheptanoic acid (PFHpA)	1.5	J	1.7	0.50	ng/L		08/23/18 08:51	08/26/18 01:44	1
Perfluorooctanoic acid (PFOA)	1.8	M	1.7	0.45	ng/L		08/23/18 08:51	08/26/18 01:44	1
Perfluorooctanesulfonic acid (PFOS)	5.9	M	3.3	0.91	ng/L		08/23/18 08:51	08/26/18 01:44	1
Perfluorononanoic acid (PFNA)	1.2	U	1.7	0.43	ng/L		08/23/18 08:51	08/26/18 01:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	79		50 - 150				08/23/18 08:51	08/26/18 01:44	1
13C4-PFHpA	90		50 - 150				08/23/18 08:51	08/26/18 01:44	1
13C4 PFOA	90		50 - 150				08/23/18 08:51	08/26/18 01:44	1
13C3-PFBS	73		50 - 150				08/23/18 08:51	08/26/18 01:44	1
13C4 PFOS	71		50 - 150				08/23/18 08:51	08/26/18 01:44	1
13C5 PFNA	81		50 - 150				08/23/18 08:51	08/26/18 01:44	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW113

Lab Sample ID: 320-42093-13

Date Collected: 08/10/18 11:26

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.5		1.8	0.40	ng/L		08/23/18 10:33	08/25/18 19:10	1
Perfluorohexanesulfonic acid (PFHxS)	2.9		1.8	0.33	ng/L		08/23/18 10:33	08/25/18 19:10	1
Perfluoroheptanoic acid (PFHpA)	0.74	J	1.8	0.54	ng/L		08/23/18 10:33	08/25/18 19:10	1
Perfluorooctanoic acid (PFOA)	2.4	M	1.8	0.48	ng/L		08/23/18 10:33	08/25/18 19:10	1
Perfluorooctanesulfonic acid (PFOS)	2.5	J M	3.5	0.97	ng/L		08/23/18 10:33	08/25/18 19:10	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/23/18 10:33	08/25/18 19:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	83		50 - 150				08/23/18 10:33	08/25/18 19:10	1
13C4-PFHpA	78		50 - 150				08/23/18 10:33	08/25/18 19:10	1
13C4 PFOA	79		50 - 150				08/23/18 10:33	08/25/18 19:10	1
13C3-PFBS	76		50 - 150				08/23/18 10:33	08/25/18 19:10	1
13C4 PFOS	70		50 - 150				08/23/18 10:33	08/25/18 19:10	1
13C5 PFNA	78		50 - 150				08/23/18 10:33	08/25/18 19:10	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW114

Lab Sample ID: 320-42093-14

Date Collected: 08/10/18 11:16

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.82	J M	1.7	0.40	ng/L		08/23/18 10:33	08/25/18 19:18	1
Perfluorohexanesulfonic acid (PFHxS)	3.5		1.7	0.33	ng/L		08/23/18 10:33	08/25/18 19:18	1
Perfluoroheptanoic acid (PFHpA)	0.83	J	1.7	0.52	ng/L		08/23/18 10:33	08/25/18 19:18	1
Perfluorooctanoic acid (PFOA)	2.1	M	1.7	0.46	ng/L		08/23/18 10:33	08/25/18 19:18	1
Perfluorooctanesulfonic acid (PFOS)	2.9	J	3.4	0.95	ng/L		08/23/18 10:33	08/25/18 19:18	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/23/18 10:33	08/25/18 19:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	86		50 - 150				08/23/18 10:33	08/25/18 19:18	1
13C4-PFHpA	83		50 - 150				08/23/18 10:33	08/25/18 19:18	1
13C4 PFOA	83		50 - 150				08/23/18 10:33	08/25/18 19:18	1
13C3-PFBS	84		50 - 150				08/23/18 10:33	08/25/18 19:18	1
13C4 PFOS	81		50 - 150				08/23/18 10:33	08/25/18 19:18	1
13C5 PFNA	85		50 - 150				08/23/18 10:33	08/25/18 19:18	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW115

Lab Sample ID: 320-42093-15

Date Collected: 08/10/18 17:59

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.88	U	1.8	0.40	ng/L		08/23/18 10:33	08/25/18 19:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.58	J	1.8	0.33	ng/L		08/23/18 10:33	08/25/18 19:26	1
Perfluoroheptanoic acid (PFHpA)	1.3	U	1.8	0.53	ng/L		08/23/18 10:33	08/25/18 19:26	1
Perfluorooctanoic acid (PFOA)	1.3	U M	1.8	0.47	ng/L		08/23/18 10:33	08/25/18 19:26	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U M	3.5	0.96	ng/L		08/23/18 10:33	08/25/18 19:26	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/23/18 10:33	08/25/18 19:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	86		50 - 150				08/23/18 10:33	08/25/18 19:26	1
13C4-PFHpA	83		50 - 150				08/23/18 10:33	08/25/18 19:26	1
13C4 PFOA	85		50 - 150				08/23/18 10:33	08/25/18 19:26	1
13C3-PFBS	81		50 - 150				08/23/18 10:33	08/25/18 19:26	1
13C4 PFOS	80		50 - 150				08/23/18 10:33	08/25/18 19:26	1
13C5 PFNA	85		50 - 150				08/23/18 10:33	08/25/18 19:26	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW116

Lab Sample ID: 320-42093-16

Date Collected: 08/11/18 12:59

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.86	U	1.7	0.39	ng/L		08/23/18 10:33	08/25/18 19:33	1
Perfluorohexanesulfonic acid (PFHxS)	0.67	J	1.7	0.33	ng/L		08/23/18 10:33	08/25/18 19:33	1
Perfluoroheptanoic acid (PFHpA)	1.3	U	1.7	0.52	ng/L		08/23/18 10:33	08/25/18 19:33	1
Perfluorooctanoic acid (PFOA)	1.3	U M	1.7	0.46	ng/L		08/23/18 10:33	08/25/18 19:33	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U M	3.4	0.94	ng/L		08/23/18 10:33	08/25/18 19:33	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/23/18 10:33	08/25/18 19:33	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	85		50 - 150				08/23/18 10:33	08/25/18 19:33	1
13C4-PFHpA	84		50 - 150				08/23/18 10:33	08/25/18 19:33	1
13C4 PFOA	86		50 - 150				08/23/18 10:33	08/25/18 19:33	1
13C3-PFBS	78		50 - 150				08/23/18 10:33	08/25/18 19:33	1
13C4 PFOS	76		50 - 150				08/23/18 10:33	08/25/18 19:33	1
13C5 PFNA	85		50 - 150				08/23/18 10:33	08/25/18 19:33	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW117

Lab Sample ID: 320-42093-17

Date Collected: 08/10/18 15:26

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	65		1.7	0.39	ng/L		08/23/18 10:33	08/25/18 19:41	1
Perfluorohexanesulfonic acid (PFHxS)	230		1.7	0.33	ng/L		08/23/18 10:33	08/25/18 19:41	1
Perfluoroheptanoic acid (PFHpA)	11	M	1.7	0.52	ng/L		08/23/18 10:33	08/25/18 19:41	1
Perfluorooctanoic acid (PFOA)	99	M	1.7	0.46	ng/L		08/23/18 10:33	08/25/18 19:41	1
Perfluorooctanesulfonic acid (PFOS)	230		3.4	0.94	ng/L		08/23/18 10:33	08/25/18 19:41	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/23/18 10:33	08/25/18 19:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	70		50 - 150				08/23/18 10:33	08/25/18 19:41	1
13C4-PFHpA	71		50 - 150				08/23/18 10:33	08/25/18 19:41	1
13C4 PFOA	75		50 - 150				08/23/18 10:33	08/25/18 19:41	1
13C3-PFBS	69		50 - 150				08/23/18 10:33	08/25/18 19:41	1
13C4 PFOS	66		50 - 150				08/23/18 10:33	08/25/18 19:41	1
13C5 PFNA	71		50 - 150				08/23/18 10:33	08/25/18 19:41	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW118

Lab Sample ID: 320-42093-18

Date Collected: 08/10/18 15:47

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.88	U	1.8	0.40	ng/L		08/23/18 10:33	08/25/18 19:48	1
Perfluorohexanesulfonic acid (PFHxS)	0.53	J M	1.8	0.33	ng/L		08/23/18 10:33	08/25/18 19:48	1
Perfluoroheptanoic acid (PFHpA)	1.3	U	1.8	0.54	ng/L		08/23/18 10:33	08/25/18 19:48	1
Perfluorooctanoic acid (PFOA)	1.3	U	1.8	0.47	ng/L		08/23/18 10:33	08/25/18 19:48	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U M	3.5	0.97	ng/L		08/23/18 10:33	08/25/18 19:48	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/23/18 10:33	08/25/18 19:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	84		50 - 150				08/23/18 10:33	08/25/18 19:48	1
13C4-PFHpA	89		50 - 150				08/23/18 10:33	08/25/18 19:48	1
13C4 PFOA	86		50 - 150				08/23/18 10:33	08/25/18 19:48	1
13C3-PFBS	82		50 - 150				08/23/18 10:33	08/25/18 19:48	1
13C4 PFOS	87		50 - 150				08/23/18 10:33	08/25/18 19:48	1
13C5 PFNA	90		50 - 150				08/23/18 10:33	08/25/18 19:48	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-MW15

Lab Sample ID: 320-42093-19

Date Collected: 08/11/18 14:06

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.9		1.8	0.41	ng/L		08/23/18 10:33	08/25/18 19:56	1
Perfluorohexanesulfonic acid (PFHxS)	20		1.8	0.34	ng/L		08/23/18 10:33	08/25/18 19:56	1
Perfluoroheptanoic acid (PFHpA)	1.2	J M	1.8	0.55	ng/L		08/23/18 10:33	08/25/18 19:56	1
Perfluorooctanoic acid (PFOA)	4.2	M	1.8	0.49	ng/L		08/23/18 10:33	08/25/18 19:56	1
Perfluorooctanesulfonic acid (PFOS)	9.7		3.6	0.99	ng/L		08/23/18 10:33	08/25/18 19:56	1
Perfluorononanoic acid (PFNA)	1.4	U M	1.8	0.47	ng/L		08/23/18 10:33	08/25/18 19:56	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	79		50 - 150				08/23/18 10:33	08/25/18 19:56	1
13C4-PFHpA	80		50 - 150				08/23/18 10:33	08/25/18 19:56	1
13C4 PFOA	83		50 - 150				08/23/18 10:33	08/25/18 19:56	1
13C3-PFBS	76		50 - 150				08/23/18 10:33	08/25/18 19:56	1
13C4 PFOS	74		50 - 150				08/23/18 10:33	08/25/18 19:56	1
13C5 PFNA	78		50 - 150				08/23/18 10:33	08/25/18 19:56	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-MW18

Lab Sample ID: 320-42093-20

Date Collected: 08/10/18 14:55

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	13	M	1.8	0.41	ng/L		08/23/18 10:33	08/25/18 20:11	1
Perfluorohexanesulfonic acid (PFHxS)	54		1.8	0.33	ng/L		08/23/18 10:33	08/25/18 20:11	1
Perfluoroheptanoic acid (PFHpA)	11	M	1.8	0.54	ng/L		08/23/18 10:33	08/25/18 20:11	1
Perfluorooctanoic acid (PFOA)	47	M	1.8	0.48	ng/L		08/23/18 10:33	08/25/18 20:11	1
Perfluorooctanesulfonic acid (PFOS)	22		3.5	0.97	ng/L		08/23/18 10:33	08/25/18 20:11	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/23/18 10:33	08/25/18 20:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	65		50 - 150				08/23/18 10:33	08/25/18 20:11	1
13C4-PFHpA	66		50 - 150				08/23/18 10:33	08/25/18 20:11	1
13C4 PFOA	71		50 - 150				08/23/18 10:33	08/25/18 20:11	1
13C3-PFBS	64		50 - 150				08/23/18 10:33	08/25/18 20:11	1
13C4 PFOS	66		50 - 150				08/23/18 10:33	08/25/18 20:11	1
13C5 PFNA	74		50 - 150				08/23/18 10:33	08/25/18 20:11	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-MW30R

Lab Sample ID: 320-42093-21

Date Collected: 08/11/18 12:10

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	860	E	1.8	0.42	ng/L		08/23/18 10:33	08/25/18 20:18	1
Perfluorohexanesulfonic acid (PFHxS)	960	M E	1.8	0.35	ng/L		08/23/18 10:33	08/25/18 20:18	1
Perfluoroheptanoic acid (PFHpA)	120	M	1.8	0.56	ng/L		08/23/18 10:33	08/25/18 20:18	1
Perfluorooctanoic acid (PFOA)	310		1.8	0.49	ng/L		08/23/18 10:33	08/25/18 20:18	1
Perfluorooctanesulfonic acid (PFOS)	5.4	M	3.6	1.0	ng/L		08/23/18 10:33	08/25/18 20:18	1
Perfluorononanoic acid (PFNA)	1.4	U M	1.8	0.47	ng/L		08/23/18 10:33	08/25/18 20:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	76		50 - 150				08/23/18 10:33	08/25/18 20:18	1
13C4-PFHpA	65		50 - 150				08/23/18 10:33	08/25/18 20:18	1
13C4 PFOA	77		50 - 150				08/23/18 10:33	08/25/18 20:18	1
13C3-PFBS	63	M	50 - 150				08/23/18 10:33	08/25/18 20:18	1
13C4 PFOS	80		50 - 150				08/23/18 10:33	08/25/18 20:18	1
13C5 PFNA	84		50 - 150				08/23/18 10:33	08/25/18 20:18	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	D	36	8.4	ng/L		08/23/18 10:33	08/27/18 20:00	20
Perfluorohexanesulfonic acid (PFHxS)	1200	D M	36	6.9	ng/L		08/23/18 10:33	08/27/18 20:00	20
Perfluoroheptanoic acid (PFHpA)	110	D M	36	11	ng/L		08/23/18 10:33	08/27/18 20:00	20
Perfluorooctanoic acid (PFOA)	330	D M	36	9.8	ng/L		08/23/18 10:33	08/27/18 20:00	20
Perfluorooctanesulfonic acid (PFOS)	55	U	73	20	ng/L		08/23/18 10:33	08/27/18 20:00	20
Perfluorononanoic acid (PFNA)	27	U M	36	9.5	ng/L		08/23/18 10:33	08/27/18 20:00	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	71		50 - 150				08/23/18 10:33	08/27/18 20:00	20
13C4-PFHpA	81		50 - 150				08/23/18 10:33	08/27/18 20:00	20
13C4 PFOA	77		50 - 150				08/23/18 10:33	08/27/18 20:00	20
13C3-PFBS	70		50 - 150				08/23/18 10:33	08/27/18 20:00	20
13C4 PFOS	66		50 - 150				08/23/18 10:33	08/27/18 20:00	20
13C5 PFNA	69		50 - 150				08/23/18 10:33	08/27/18 20:00	20

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-MW34

Lab Sample ID: 320-42093-22

Date Collected: 08/11/18 08:52

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.1		1.8	0.41	ng/L		08/23/18 10:33	08/27/18 19:52	1
Perfluorohexanesulfonic acid (PFHxS)	67	M	1.8	0.34	ng/L		08/23/18 10:33	08/27/18 19:52	1
Perfluoroheptanoic acid (PFHpA)	4.6		1.8	0.54	ng/L		08/23/18 10:33	08/27/18 19:52	1
Perfluorooctanoic acid (PFOA)	25	M	1.8	0.48	ng/L		08/23/18 10:33	08/27/18 19:52	1
Perfluorooctanesulfonic acid (PFOS)	50		3.5	0.97	ng/L		08/23/18 10:33	08/27/18 19:52	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/23/18 10:33	08/27/18 19:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	64		50 - 150				08/23/18 10:33	08/27/18 19:52	1
13C4-PFHpA	71		50 - 150				08/23/18 10:33	08/27/18 19:52	1
13C4 PFOA	70		50 - 150				08/23/18 10:33	08/27/18 19:52	1
13C3-PFBS	63		50 - 150				08/23/18 10:33	08/27/18 19:52	1
13C4 PFOS	64		50 - 150				08/23/18 10:33	08/27/18 19:52	1
13C5 PFNA	66		50 - 150				08/23/18 10:33	08/27/18 19:52	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-MW38

Lab Sample ID: 320-42093-23

Date Collected: 08/11/18 14:08

Matrix: Water

Date Received: 08/14/18 08:15

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.0	M	1.8	0.41	ng/L		08/23/18 10:33	08/25/18 20:33	1
Perfluorohexanesulfonic acid (PFHxS)	20		1.8	0.34	ng/L		08/23/18 10:33	08/25/18 20:33	1
Perfluoroheptanoic acid (PFHpA)	1.3	J M	1.8	0.55	ng/L		08/23/18 10:33	08/25/18 20:33	1
Perfluorooctanoic acid (PFOA)	4.6	M	1.8	0.49	ng/L		08/23/18 10:33	08/25/18 20:33	1
Perfluorooctanesulfonic acid (PFOS)	10		3.6	0.99	ng/L		08/23/18 10:33	08/25/18 20:33	1
Perfluorononanoic acid (PFNA)	1.4	U M	1.8	0.47	ng/L		08/23/18 10:33	08/25/18 20:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	79		50 - 150				08/23/18 10:33	08/25/18 20:33	1
13C4-PFHpA	84		50 - 150				08/23/18 10:33	08/25/18 20:33	1
13C4 PFOA	83		50 - 150				08/23/18 10:33	08/25/18 20:33	1
13C3-PFBS	73		50 - 150				08/23/18 10:33	08/25/18 20:33	1
13C4 PFOS	74		50 - 150				08/23/18 10:33	08/25/18 20:33	1
13C5 PFNA	79		50 - 150				08/23/18 10:33	08/25/18 20:33	1

Isotope Dilution Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PFHxS (50-150)	PFHpA (50-150)	PFOA (50-150)	3C3-PFBs (50-150)	PFOS (50-150)	PFNA (50-150)
320-42093-1	FAI18-SW101	84	94	89	82	79	86
320-42093-2	FAI18-SW102	82	96	86	76	71	82
320-42093-3	FAI18-SW103	82	93	88	83	75	81
320-42093-4	FAI18-SW104	78	92	89	78	73	81
320-42093-5	FAI18-SW105	74	88	86	70	71	81
320-42093-6	FAI18-SW106	81	96	92	88	73	81
320-42093-7	FAI18-SW107	77	93	86	82	67	77
320-42093-8	FAI18-SW108	77	94	90	81	70	81
320-42093-9	FAI18-SW109	79	89	84	80	69	76
320-42093-10	FAI18-SW110	91	105	96	86	84	89
320-42093-11	FAI18-SW111	80	94	89	85	73	80
320-42093-12	FAI18-SW112	79	90	90	73	71	81
320-42093-13	FAI18-SW113	83	78	79	76	70	78
320-42093-14	FAI18-SW114	86	83	83	84	81	85
320-42093-15	FAI18-SW115	86	83	85	81	80	85
320-42093-16	FAI18-SW116	85	84	86	78	76	85
320-42093-17	FAI18-SW117	70	71	75	69	66	71
320-42093-18	FAI18-SW118	84	89	86	82	87	90
320-42093-19	FAI18-MW15	79	80	83	76	74	78
320-42093-20	FAI18-MW18	65	66	71	64	66	74
320-42093-21	FAI18-MW30R	76	65	77	63 M	80	84
320-42093-21 - DL	FAI18-MW30R	71	81	77	70	66	69
320-42093-22	FAI18-MW34	64	71	70	63	64	66
320-42093-23	FAI18-MW38	79	84	83	73	74	79
LCS 320-241570/2-A	Lab Control Sample	86	97	91	88	86	88
LCS 320-241604/2-A	Lab Control Sample	79	82	81	79	74	82
LCSD 320-241604/3-A	Lab Control Sample Dup	76	76	80	80	75	80
MB 320-241570/1-A	Method Blank	88	92	91	85	82	87
MB 320-241604/1-A	Method Blank	75	74	75	74	70	74

Surrogate Legend

- PFHxS = 18O2 PFHxS
- PFHpA = 13C4-PFHpA
- PFOA = 13C4 PFOA
- 13C3-PFBS = 13C3-PFBS
- PFOS = 13C4 PFOS
- PFNA = 13C5 PFNA

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Lab Sample ID: MB 320-241570/1-A

Matrix: Water

Analysis Batch: 242091

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 241570

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		08/23/18 08:51	08/25/18 22:28	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		08/23/18 08:51	08/25/18 22:28	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		08/23/18 08:51	08/25/18 22:28	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		08/23/18 08:51	08/25/18 22:28	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.1	ng/L		08/23/18 08:51	08/25/18 22:28	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		08/23/18 08:51	08/25/18 22:28	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	88		50 - 150	08/23/18 08:51	08/25/18 22:28	1
13C4-PFHpA	92		50 - 150	08/23/18 08:51	08/25/18 22:28	1
13C4 PFOA	91		50 - 150	08/23/18 08:51	08/25/18 22:28	1
13C3-PFBS	85		50 - 150	08/23/18 08:51	08/25/18 22:28	1
13C4 PFOS	82		50 - 150	08/23/18 08:51	08/25/18 22:28	1
13C5 PFNA	87		50 - 150	08/23/18 08:51	08/25/18 22:28	1

Lab Sample ID: LCS 320-241570/2-A

Matrix: Water

Analysis Batch: 242091

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 241570

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	36.1		ng/L		102	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.7	M	ng/L		101	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	39.3		ng/L		98	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	40.3		ng/L		101	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	37.9		ng/L		102	82 - 112
Perfluorononanoic acid (PFNA)	40.0	40.7		ng/L		102	83 - 113

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	86		50 - 150
13C4-PFHpA	97		50 - 150
13C4 PFOA	91		50 - 150
13C3-PFBS	88		50 - 150
13C4 PFOS	86		50 - 150
13C5 PFNA	88		50 - 150

Lab Sample ID: MB 320-241604/1-A

Matrix: Water

Analysis Batch: 242125

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 241604

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		08/23/18 10:33	08/25/18 18:48	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		08/23/18 10:33	08/25/18 18:48	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		08/23/18 10:33	08/25/18 18:48	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		08/23/18 10:33	08/25/18 18:48	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.1	ng/L		08/23/18 10:33	08/25/18 18:48	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		08/23/18 10:33	08/25/18 18:48	1

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	75		50 - 150	08/23/18 10:33	08/25/18 18:48	1
13C4-PFHpa	74		50 - 150	08/23/18 10:33	08/25/18 18:48	1
13C4 PFOA	75		50 - 150	08/23/18 10:33	08/25/18 18:48	1
13C3-PFBS	74		50 - 150	08/23/18 10:33	08/25/18 18:48	1
13C4 PFOS	70		50 - 150	08/23/18 10:33	08/25/18 18:48	1
13C5 PFNA	74		50 - 150	08/23/18 10:33	08/25/18 18:48	1

Lab Sample ID: LCS 320-241604/2-A
Matrix: Water
Analysis Batch: 242125

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 241604

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.9		ng/L		96	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	41.7		ng/L		104	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	41.1		ng/L		103	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	40.9		ng/L		110	82 - 112
Perfluorononanoic acid (PFNA)	40.0	43.1		ng/L		108	83 - 113

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	79		50 - 150
13C4-PFHpa	82		50 - 150
13C4 PFOA	81		50 - 150
13C3-PFBS	79		50 - 150
13C4 PFOS	74		50 - 150
13C5 PFNA	82		50 - 150

Lab Sample ID: LCSD 320-241604/3-A
Matrix: Water
Analysis Batch: 242125

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 241604

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.6		ng/L		98	81 - 106	2	30
Perfluoroheptanoic acid (PFHpA)	40.0	44.0		ng/L		110	80 - 113	5	30
Perfluorooctanoic acid (PFOA)	40.0	42.5		ng/L		106	80 - 107	3	30
Perfluorooctanesulfonic acid (PFOS)	37.1	38.7		ng/L		104	82 - 112	5	30
Perfluorononanoic acid (PFNA)	40.0	41.8		ng/L		105	83 - 113	3	30

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
18O2 PFHxS	76		50 - 150
13C4-PFHpa	76		50 - 150
13C4 PFOA	80		50 - 150
13C3-PFBS	80		50 - 150
13C4 PFOS	75		50 - 150
13C5 PFNA	80		50 - 150

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

LCMS

Prep Batch: 241570

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42093-1	FAI18-SW101	Total/NA	Water	3535	
320-42093-2	FAI18-SW102	Total/NA	Water	3535	
320-42093-3	FAI18-SW103	Total/NA	Water	3535	
320-42093-4	FAI18-SW104	Total/NA	Water	3535	
320-42093-5	FAI18-SW105	Total/NA	Water	3535	
320-42093-6	FAI18-SW106	Total/NA	Water	3535	
320-42093-7	FAI18-SW107	Total/NA	Water	3535	
320-42093-8	FAI18-SW108	Total/NA	Water	3535	
320-42093-9	FAI18-SW109	Total/NA	Water	3535	
320-42093-10	FAI18-SW110	Total/NA	Water	3535	
320-42093-11	FAI18-SW111	Total/NA	Water	3535	
320-42093-12	FAI18-SW112	Total/NA	Water	3535	
MB 320-241570/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-241570/2-A	Lab Control Sample	Total/NA	Water	3535	

Prep Batch: 241604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42093-13	FAI18-SW113	Total/NA	Water	3535	
320-42093-14	FAI18-SW114	Total/NA	Water	3535	
320-42093-15	FAI18-SW115	Total/NA	Water	3535	
320-42093-16	FAI18-SW116	Total/NA	Water	3535	
320-42093-17	FAI18-SW117	Total/NA	Water	3535	
320-42093-18	FAI18-SW118	Total/NA	Water	3535	
320-42093-19	FAI18-MW15	Total/NA	Water	3535	
320-42093-20	FAI18-MW18	Total/NA	Water	3535	
320-42093-21 - DL	FAI18-MW30R	Total/NA	Water	3535	
320-42093-21	FAI18-MW30R	Total/NA	Water	3535	
320-42093-22	FAI18-MW34	Total/NA	Water	3535	
320-42093-23	FAI18-MW38	Total/NA	Water	3535	
MB 320-241604/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-241604/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-241604/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 242091

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42093-1	FAI18-SW101	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-2	FAI18-SW102	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-3	FAI18-SW103	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-4	FAI18-SW104	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-5	FAI18-SW105	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-6	FAI18-SW106	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-7	FAI18-SW107	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-8	FAI18-SW108	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-9	FAI18-SW109	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-10	FAI18-SW110	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-11	FAI18-SW111	Total/NA	Water	EPA 537 (Mod)	241570
320-42093-12	FAI18-SW112	Total/NA	Water	EPA 537 (Mod)	241570
MB 320-241570/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	241570
LCS 320-241570/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	241570

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

LCMS (Continued)

Analysis Batch: 242125

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42093-13	FAI18-SW113	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-14	FAI18-SW114	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-15	FAI18-SW115	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-16	FAI18-SW116	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-17	FAI18-SW117	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-18	FAI18-SW118	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-19	FAI18-MW15	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-20	FAI18-MW18	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-21	FAI18-MW30R	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-23	FAI18-MW38	Total/NA	Water	EPA 537 (Mod)	241604
MB 320-241604/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	241604
LCS 320-241604/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	241604
LCSD 320-241604/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	241604

Analysis Batch: 242410

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42093-21 - DL	FAI18-MW30R	Total/NA	Water	EPA 537 (Mod)	241604
320-42093-22	FAI18-MW34	Total/NA	Water	EPA 537 (Mod)	241604

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW101

Date Collected: 08/11/18 09:22

Date Received: 08/14/18 08:15

Lab Sample ID: 320-42093-1

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	3535			302.2 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 00:10	AAR	TAL SAC

Client Sample ID: FAI18-SW102

Date Collected: 08/10/18 17:24

Date Received: 08/14/18 08:15

Lab Sample ID: 320-42093-2

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	3535			309.5 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 00:18	AAR	TAL SAC

Client Sample ID: FAI18-SW103

Date Collected: 08/10/18 15:45

Date Received: 08/14/18 08:15

Lab Sample ID: 320-42093-3

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	3535			298.8 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 00:26	AAR	TAL SAC

Client Sample ID: FAI18-SW104

Date Collected: 08/10/18 12:07

Date Received: 08/14/18 08:15

Lab Sample ID: 320-42093-4

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	3535			296.2 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 00:33	AAR	TAL SAC

Client Sample ID: FAI18-SW105

Date Collected: 08/10/18 12:23

Date Received: 08/14/18 08:15

Lab Sample ID: 320-42093-5

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	3535			300.2 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 00:41	AAR	TAL SAC

Client Sample ID: FAI18-SW106

Date Collected: 08/10/18 15:25

Date Received: 08/14/18 08:15

Lab Sample ID: 320-42093-6

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	3535			310.5 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 00:49	AAR	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW107

Lab Sample ID: 320-42093-7

Date Collected: 08/10/18 13:20

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			306.4 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 00:57	AAR	TAL SAC

Client Sample ID: FAI18-SW108

Lab Sample ID: 320-42093-8

Date Collected: 08/10/18 13:44

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			300 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 01:05	AAR	TAL SAC

Client Sample ID: FAI18-SW109

Lab Sample ID: 320-42093-9

Date Collected: 08/10/18 11:42

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			304.7 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 01:20	AAR	TAL SAC

Client Sample ID: FAI18-SW110

Lab Sample ID: 320-42093-10

Date Collected: 08/10/18 10:37

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			302.9 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 01:28	AAR	TAL SAC

Client Sample ID: FAI18-SW111

Lab Sample ID: 320-42093-11

Date Collected: 08/10/18 10:28

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			303.5 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 01:36	AAR	TAL SAC

Client Sample ID: FAI18-SW112

Lab Sample ID: 320-42093-12

Date Collected: 08/10/18 10:59

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			302.3 mL	10.00 mL	241570	08/23/18 08:51	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242091	08/26/18 01:44	AAR	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-SW113

Lab Sample ID: 320-42093-13

Date Collected: 08/10/18 11:26

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			284 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 19:10	AAR	TAL SAC

Client Sample ID: FAI18-SW114

Lab Sample ID: 320-42093-14

Date Collected: 08/10/18 11:16

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			290.7 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 19:18	AAR	TAL SAC

Client Sample ID: FAI18-SW115

Lab Sample ID: 320-42093-15

Date Collected: 08/10/18 17:59

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			285.1 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 19:26	AAR	TAL SAC

Client Sample ID: FAI18-SW116

Lab Sample ID: 320-42093-16

Date Collected: 08/11/18 12:59

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			291.5 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 19:33	AAR	TAL SAC

Client Sample ID: FAI18-SW117

Lab Sample ID: 320-42093-17

Date Collected: 08/10/18 15:26

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			291.2 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 19:41	AAR	TAL SAC

Client Sample ID: FAI18-SW118

Lab Sample ID: 320-42093-18

Date Collected: 08/10/18 15:47

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			284.4 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 19:48	AAR	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Client Sample ID: FAI18-MW15

Lab Sample ID: 320-42093-19

Date Collected: 08/11/18 14:06

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			277.5 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 19:56	AAR	TAL SAC

Client Sample ID: FAI18-MW18

Lab Sample ID: 320-42093-20

Date Collected: 08/10/18 14:55

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			283.6 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 20:11	AAR	TAL SAC

Client Sample ID: FAI18-MW30R

Lab Sample ID: 320-42093-21

Date Collected: 08/11/18 12:10

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		274.6 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	20			242410	08/27/18 20:00	S1M	TAL SAC
Total/NA	Prep	3535			274.6 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 20:18	AAR	TAL SAC

Client Sample ID: FAI18-MW34

Lab Sample ID: 320-42093-22

Date Collected: 08/11/18 08:52

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			283.4 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242410	08/27/18 19:52	S1M	TAL SAC

Client Sample ID: FAI18-MW38

Lab Sample ID: 320-42093-23

Date Collected: 08/11/18 14:08

Matrix: Water

Date Received: 08/14/18 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			277.2 mL	10.00 mL	241604	08/23/18 10:33	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242125	08/25/18 20:33	AAR	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-19

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Method Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42093-1

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod) 3535	PFAS for QSM 5.1, Table B-15 Solid-Phase Extraction (SPE)	DOD 5.1 SW846	TAL SAC TAL SAC

Protocol References:

DOD 5.1 = Department of Defense Quality Systems Manual V5.1

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Sample Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

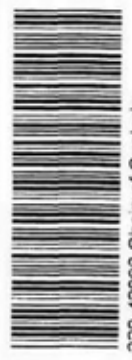
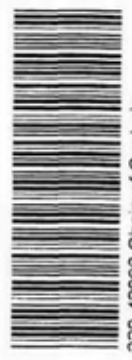
TestAmerica Job ID: 320-42093-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42093-1	FAI18-SW101	Water	08/11/18 09:22	08/14/18 08:15
320-42093-2	FAI18-SW102	Water	08/10/18 17:24	08/14/18 08:15
320-42093-3	FAI18-SW103	Water	08/10/18 15:45	08/14/18 08:15
320-42093-4	FAI18-SW104	Water	08/10/18 12:07	08/14/18 08:15
320-42093-5	FAI18-SW105	Water	08/10/18 12:23	08/14/18 08:15
320-42093-6	FAI18-SW106	Water	08/10/18 15:25	08/14/18 08:15
320-42093-7	FAI18-SW107	Water	08/10/18 13:20	08/14/18 08:15
320-42093-8	FAI18-SW108	Water	08/10/18 13:44	08/14/18 08:15
320-42093-9	FAI18-SW109	Water	08/10/18 11:42	08/14/18 08:15
320-42093-10	FAI18-SW110	Water	08/10/18 10:37	08/14/18 08:15
320-42093-11	FAI18-SW111	Water	08/10/18 10:28	08/14/18 08:15
320-42093-12	FAI18-SW112	Water	08/10/18 10:59	08/14/18 08:15
320-42093-13	FAI18-SW113	Water	08/10/18 11:26	08/14/18 08:15
320-42093-14	FAI18-SW114	Water	08/10/18 11:16	08/14/18 08:15
320-42093-15	FAI18-SW115	Water	08/10/18 17:59	08/14/18 08:15
320-42093-16	FAI18-SW116	Water	08/11/18 12:59	08/14/18 08:15
320-42093-17	FAI18-SW117	Water	08/10/18 15:26	08/14/18 08:15
320-42093-18	FAI18-SW118	Water	08/10/18 15:47	08/14/18 08:15
320-42093-19	FAI18-MW15	Water	08/11/18 14:06	08/14/18 08:15
320-42093-20	FAI18-MW18	Water	08/10/18 14:55	08/14/18 08:15
320-42093-21	FAI18-MW30R	Water	08/11/18 12:10	08/14/18 08:15
320-42093-22	FAI18-MW34	Water	08/11/18 08:52	08/14/18 08:15
320-42093-23	FAI18-MW38	Water	08/11/18 14:08	08/14/18 08:15



R&M CONSULTANTS, INC.

CHAIN OF CUSTODY RECORD

Client:	R&M Consultants, Inc	Analytical Laboratory	TA-Sacramento	DOD Project?:	No	Cooler ID:	Page	1 of 2																																																																																																																																																																																									
Project No. / NPDL No.:	2393.03	EIE420, REPAIR APRON ROWS	907.646.9655	Preservative/Analysis	GOLD																																																																																																																																																																																												
Contact Name:	Christopher Fell	cfell@rmconsult.com	rodney@arcticdataservices.com	<div style="text-align: center;">  <p>320-42093 Chain of Custody</p> </div>					Remarks																																																																																																																																																																																								
Reports To:	Christopher Fell																																																																																																																																																																																																
Invoice To:	R&M Consultants, Inc Attn: Accounting Department/Courtney Maillet 9101 Vanguard Drive, Anchorage, AK, 99507 cmaillet@rmconsult.com / 907.522.1707	PO #: 2393.03	Quote #: 32010764	<div style="text-align: center;">  <p>320-42093 Chain of Custody</p> </div>					Remarks																																																																																																																																																																																								
RESERVED for lab use																																																																																																																																																																																																	
Sample Identification	LocID	Sampler	Date (mm/dd/yy)	Time (hhmm)	Matrix/Matrix Code	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Sample Type (ie Grab(s), Comp(s), etc)</td> <td style="width: 15%;">No. Containers</td> <td style="width: 15%;">(EPA 537 modified) PFAS</td> <td style="width: 15%;">(PTHA, PFA, PFAA, PFS, PFHS, PFS)</td> <td style="width: 15%;">0-6°C</td> </tr> <tr> <td>FAI18-SW101</td> <td>SW101</td> <td>C. Fell</td> <td>08/11/18</td> <td>0922</td> <td>W</td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW102</td> <td>SW102</td> <td></td> <td>08/10/18</td> <td>1724</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW103</td> <td>SW103</td> <td></td> <td>08/10/18</td> <td>1545</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW104</td> <td>SW104</td> <td></td> <td>08/10/18</td> <td>1207</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW105</td> <td>SW105</td> <td></td> <td>08/10/18</td> <td>1223</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW106</td> <td>SW106</td> <td></td> <td>08/10/18</td> <td>1525</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW107</td> <td>SW107</td> <td></td> <td>08/10/18</td> <td>1320</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW108</td> <td>SW108</td> <td></td> <td>08/10/18</td> <td>1344</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW109</td> <td>SW109</td> <td></td> <td>08/10/18</td> <td>1142</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW110</td> <td>SW110</td> <td></td> <td>08/10/18</td> <td>1037</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW111</td> <td>SW111</td> <td></td> <td>08/10/18</td> <td>1028</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW112</td> <td>SW112</td> <td></td> <td>08/10/18</td> <td>1059</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW113</td> <td>SW113</td> <td></td> <td>08/10/18</td> <td>1126</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW114</td> <td>SW114</td> <td></td> <td>08/10/18</td> <td>1116</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW115</td> <td>SW115</td> <td></td> <td>08/10/18</td> <td>1759</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW116</td> <td>SW116</td> <td></td> <td>08/11/18</td> <td>1259</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW117</td> <td>SW117</td> <td></td> <td>08/10/18</td> <td>1526</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FAI18-SW118</td> <td>SW118</td> <td></td> <td>08/10/18</td> <td>1547</td> <td></td> <td>X</td> <td></td> <td></td> <td></td> </tr> </table>			Sample Type (ie Grab(s), Comp(s), etc)	No. Containers	(EPA 537 modified) PFAS	(PTHA, PFA, PFAA, PFS, PFHS, PFS)	0-6°C	FAI18-SW101	SW101	C. Fell	08/11/18	0922	W	X				FAI18-SW102	SW102		08/10/18	1724		X				FAI18-SW103	SW103		08/10/18	1545		X				FAI18-SW104	SW104		08/10/18	1207		X				FAI18-SW105	SW105		08/10/18	1223		X				FAI18-SW106	SW106		08/10/18	1525		X				FAI18-SW107	SW107		08/10/18	1320		X				FAI18-SW108	SW108		08/10/18	1344		X				FAI18-SW109	SW109		08/10/18	1142		X				FAI18-SW110	SW110		08/10/18	1037		X				FAI18-SW111	SW111		08/10/18	1028		X				FAI18-SW112	SW112		08/10/18	1059		X				FAI18-SW113	SW113		08/10/18	1126		X				FAI18-SW114	SW114		08/10/18	1116		X				FAI18-SW115	SW115		08/10/18	1759		X				FAI18-SW116	SW116		08/11/18	1259		X				FAI18-SW117	SW117		08/10/18	1526		X				FAI18-SW118	SW118		08/10/18	1547		X			
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Relinquished by (4):	Date:	Time:	Received By:	Time:	Temp Blank °C																																																																																																																																																																																												



Login Sample Receipt Checklist

Client: R&M Consultants, Inc

Job Number: 320-42093-1

Login Number: 42093

List Source: TestAmerica Sacramento

List Number: 1

Creator: Her, David A

Question	Answer	Comment
Did cooler come with a shipping slip (air bill, etc.)?	True	782257675384
If YES, enter carrier name and airbill number.	True	
Were custody seals on outside of cooler?	True	
How many & where?	True	
Seal Date/Seal Name	True	187960/187959
Were custody seals unbroken and intact at the date and time of arrival?	True	
Were samples screened for radioactivity using the Geiger counter?	N/A	
Were custody papers in a plastic bag & taped inside to the lid?	True	
Were custody papers filled out properly (ink, signed , etc.)?	True	
Were custody papers signed in the appropriate place?	True	
Was the project identifiable from the custody papers?	True	
If YES, enter project name.	True	EIE 420, REPAIR APRON ROW
Were temperature blanks used?	True	
Cooler Temperature(s)/Thermometer ID No.	True	AK-2
Initials of designated person to acknowledge receipt of cooler.	True	JS
Describe type of packing in cooler	True	BUBBLE WRAP
Were all bottles sealed in separate plastic bags?	True	
Did all bottles arrive unbroken with labels in good condition?	True	
Were all bottle labels complete (ID, date, time, signature, preservative, etc.)?	True	
Did all bottle labels agree with custody papers?	True	
Were correct containers used for the tests indicated?	True	
Were samples preserved to correct pH, if applicable?	True	
Was a sufficient amount of sample sent for tests indicated?	True	
Were bubbles absent in the volatile organic analysis (VOA) samples?	True	
If NO, list VOA samples.	N/A	
Was the Project Manager called and status discussed?	True	
Who was called? By Whom?	True	

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: 320-42334-1
Client Project/Site: FAI PFAS
Revision: 1

For:
R&M Consultants, Inc
9101 Vanguard Drive
Anchorage, Alaska 99507

Attn: Christopher Fell



Authorized for release by:
9/20/2018 2:12:14 PM

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

LINKS

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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: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.
M	Manual integrated compound.
Q	One or more quality control criteria failed.
D	The reported value is from a dilution.
E	Result exceeded calibration range.
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

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

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Job ID: 320-42334-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 8/21/2018 8:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.5° C.

LCMS

Method(s) EPA 537 (Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) EPA 537 (Mod): Results for samples FAI18-TW101-03 (320-42334-3), FAI18-TW101-04 (320-42334-4), FAI18-TW101-05 (320-42334-5), FAI18-TW101-06 (320-42334-6), FAI18-TW101-07 (320-42334-7), FAI18-TW103-01 (320-42334-9), FAI18-TW104-01 (320-42334-10), FAI18-TW105-01 (320-42334-11) and FAI18-TW107-01 (320-42334-13) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following sample exceeded the instrument calibration range: FAI18-TW104-01 (320-42334-10) and FAI18-TW105-01 (320-42334-11). This analyte has been qualified; however, the peak did not saturate the instrument detector. This sample was diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): The concentration of Perfluorohexanesulfonic acid (PFHxS) associated with the following sample exceeded the instrument calibration range: FAI18-TW104-01 (320-42334-10) and FAI18-TW107-01 (320-42334-13). This analyte has been qualified; however, the peak did not saturate the instrument detector. This sample was diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): Results for sample FAI18-TW101-02 (320-42334-2) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were outside acceptance limits. The internal standard response was in control in the undiluted extract and both sets of data were reported. The ISTD is not used to quantitate target analytes; therefore, there is no impact to the data.

Method(s) EPA 537 (Mod): The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range: FAI18-TW101-02 (320-42334-2), FAI18-TW101-03 (320-42334-3), FAI18-TW101-04 (320-42334-4), FAI18-TW101-06 (320-42334-6) and FAI18-TW103-01 (320-42334-9). These analytes have been qualified; however, the peaks did not saturate the instrument detector. The samples were diluted within the calibration range and both sets of data were reported.

Method(s) EPA 537 (Mod): The Isotope Dilution Analyte (IDA) recovery associated with the following samples was below the method recommended limit for several IDA: FAI18-TW101-03 (320-42334-3), FAI18-TW101-05 (320-42334-5), FAI18-TW101-07 (320-42334-7), FAI18-TW104-01 (320-42334-10) and FAI18-TW106-01 (320-42334-12). 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 samples. The samples were re-extracted and re-analyzed outside of holding time and IDA recoveries improved. Multiple sets of data are reported.

Method(s) EPA 537 (Mod): The following samples were diluted to bring the concentration of target analytes within the calibration range: FAI18-TW101-03 (320-42334-3), FAI18-TW101-05 (320-42334-5), FAI18-TW101-07 (320-42334-7) and FAI18-TW104-01 (320-42334-10). Elevated reporting limits (RLs) are provided.

Method(s) EPA 537 (Mod): The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range: FAI18-TW101-03 (320-42334-3), FAI18-TW101-05 (320-42334-5), FAI18-TW101-07 (320-42334-7) and FAI18-TW104-01 (320-42334-10). These analytes have been qualified; however, the peaks did not saturate the instrument detector. The samples were also run at dilution to bring the analytes within the calibration range. Both sets of data are reported. FAI18-TW101-05 (320-42334-5), FAI18-TW101-07 (320-42334-7) and FAI18-TW104-01 (320-42334-10)

Method(s) EPA 537 (Mod): Results for samples FAI18-TW101-03 (320-42334-3), FAI18-TW101-05 (320-42334-5), FAI18-TW101-07 (320-42334-7) and FAI18-TW104-01 (320-42334-10) were reported from the analysis of a diluted extract due to high concentration of the

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Job ID: 320-42334-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method(s) EPA 537 (Mod): The concentration of Perfluoroheptanoic acid (PFHpA) and Perfluorooctanoic acid (PFOA) associated with the following sample exceeded the instrument calibration range: FAI18-TW104-01 (320-42334-10). This analyte has been qualified; however, the peak did not saturate the instrument detector. This sample was diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range at the maximum possible dilution: FAI18-TW101-05 (320-42334-5) and FAI18-TW101-07 (320-42334-7). These analytes have been qualified; however, the peak did not saturate the instrument detector. The samples were re-extracted outside the recommended hold time at a smaller sample volume to mitigate the high levels. Both sets of data are 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: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 320-242249.

Method(s) 3535: The following samples: FAI18-TW101-01 (320-42334-1), FAI18-TW101-02 (320-42334-2), FAI18-TW101-03 (320-42334-3), FAI18-TW101-04 (320-42334-4), FAI18-TW101-05 (320-42334-5), FAI18-TW101-06 (320-42334-6), FAI18-TW101-07 (320-42334-7), FAI18-TW103-01 (320-42334-9), FAI18-TW104-01 (320-42334-10), FAI18-TW105-01 (320-42334-11), FAI18-TW106-01 (320-42334-12), FAI18-TW107-01 (320-42334-13), FAI18-TW108-01 (320-42334-14), FAI18-TW110-01 (320-42334-16), FAI18-TW111-01 (320-42334-17), FAI18-TW112-01 (320-42334-18), FAI18-TW113-01 (320-42334-19) and FAI18-TW114-01 (320-42334-20) in preparation batch 320-242249 were observed to contain sediment prior to extraction.

Method(s) 3535: The following samples: FAI18-TW105-01 (320-42334-11) and FAI18-TW107-01 (320-42334-13) in preparation batch 320-242249 were observed to be an orange color prior to extraction.

Method(s) 3535: The following samples: FAI18-TW101-04 (320-42334-4), FAI18-TW101-05 (320-42334-5), FAI18-TW101-07 (320-42334-7), FAI18-TW108-01 (320-42334-14), FAI18-TW111-01 (320-42334-17) and FAI18-TW114-01 (320-42334-20) in preparation batch 320-242249 were observed to be a yellow color prior to extraction.

Method(s) 3535: The following sample: FAI18-TW104-01 (320-42334-10) in preparation batch 320-242249 was observed to be foamy prior to extraction.

Method(s) 3535: The following samples: FAI18-TW104-01 (320-42334-10) and FAI18-TW105-01 (320-42334-11) in preparation batch 320-242249 were observed to be a light yellow color after they were brought to final volume.

Method(s) 3535: The following samples FAI18-TW101-01 (320-42334-1), FAI18-TW101-02 (320-42334-2), FAI18-TW101-03 (320-42334-3), FAI18-TW101-04 (320-42334-4), FAI18-TW101-05 (320-42334-5), FAI18-TW101-06 (320-42334-6), FAI18-TW101-07 (320-42334-7), FAI18-TW103-01 (320-42334-9), FAI18-TW104-01 (320-42334-10), FAI18-TW106-01 (320-42334-12), FAI18-TW108-01 (320-42334-14), FAI18-TW110-01 (320-42334-16), FAI18-TW111-01 (320-42334-17) and FAI18-TW114-01 (320-42334-20) had non-settleable particulate matter which plugged the SPE extraction disk. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field of the prep batch. The "Tare Weight" recorded is the weight of the emptied bottle. The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3535: The following sample: FAI18-TW104-01 (320-42334-10) in preparation batch 320-242249 was centrifuged after it was fortified with IDA due to an excessive amount of sediment being present, which could potentially clog the solid-phase column.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-243894.

Method(s) 3535: Due to the matrix, the initial volume(s) used for the following samples deviated from the standard procedure: FAI18-TW101-05 (320-42334-5) and FAI18-TW101-07 (320-42334-7). The reporting limits (RLs) have been adjusted proportionately.

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Job ID: 320-42334-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

Method(s) 3535: The following samples, FAI18-TW101-03 (320-42334-3), FAI18-TW104-01 (320-42334-10) and FAI18-TW106-01 (320-42334-12), had non-settleable particulate matter which plugged the solid-phase extraction column. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field of the prep batch. The tare weight recorded is the weight of the emptied bottle.

Method(s) 3535: The following samples were re-prepared outside of preparation holding time due to low IDA recoveries during the initial analysis: FAI18-TW101-03 (320-42334-3), FAI18-TW101-05 (320-42334-5), FAI18-TW101-07 (320-42334-7), FAI18-TW104-01 (320-42334-10) and FAI18-TW106-01 (320-42334-12).

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

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-01

Lab Sample ID: 320-42334-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.75	J	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.8	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	310		3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW101-02

Lab Sample ID: 320-42334-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.1	M	1.8	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	24		1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.3	J	1.8	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.9	M	1.8	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	480	E	3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.56	J	1.8	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	25	D	18	3.3	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	530	D	35	9.6	ng/L	10		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW101-03

Lab Sample ID: 320-42334-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.5		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	48		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.8		1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	6.4	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	700	E	3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.73	J M	1.7	0.44	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	10	J D	17	3.9	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	49	D	17	3.2	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	6.5	J D M	17	4.6	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	810	D	34	9.3	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	9.2	H M	1.8	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	45	H	1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	2.8	H	1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	5.8	H M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	650	H E	3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - RE	0.67	J H M	1.8	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - REDL	11	J H D M	18	4.0	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - REDL	45	H D	18	3.3	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - REDL	6.4	J H D M	18	4.8	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - REDL	670	H D	35	9.7	ng/L	10		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-04

Lab Sample ID: 320-42334-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	140		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	310		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	10	M	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	36	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2700	E	3.4	0.94	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	2.9	M	1.7	0.44	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	330	D	85	16	ng/L	50		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	41	J D M	85	23	ng/L	50		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	4000	D	170	47	ng/L	50		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW101-05

Lab Sample ID: 320-42334-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4600	D	170	39	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	48000	E D	170	32	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3200	D	170	51	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	7600	D M	170	46	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	420000	E D	340	93	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	900	D M	170	44	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	8500	H	100	23	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	64000	H E	100	19	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	3500	H	100	31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	8000	H	100	27	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	320000	H E	200	55	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - RE	800	H M	100	26	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - REDL	95000	H D	10000	1900	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - REDL	3500	J H D	10000	3100	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - REDL	6400	J H D M	10000	2700	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - REDL	990000	H D	20000	5500	ng/L	100		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW101-06

Lab Sample ID: 320-42334-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	16		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.79	J M	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.9	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	360	E	3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.44	J M	1.7	0.44	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	15	J D	17	3.2	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	330	D	34	9.3	ng/L	10		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-07

Lab Sample ID: 320-42334-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	57000	E D	170	33	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3000	D	170	53	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	7400	D M	170	47	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	660000	E D	350	95	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	910	D	170	45	ng/L	100		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	9000	H	100	23	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	69000	H E	100	19	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	3400	H	100	31	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	8100	H	100	27	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	330000	H E	200	55	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - RE	830	H M	100	26	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - REDL	97000	H D	10000	1900	ng/L		100	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - REDL	3200	J H D	10000	3100	ng/L		100	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - REDL	7000	J H D M	10000	2700	ng/L		100	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - REDL	850000	H D	20000	5500	ng/L		100	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW102-01

Lab Sample ID: 320-42334-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.5		1.8	0.40	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.5	M	1.8	0.33	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.71	J M	1.8	0.47	ng/L		1	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW103-01

Lab Sample ID: 320-42334-9

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	35	M	1.6	0.38	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	790	E	1.6	0.31	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	24		1.6	0.50	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	180	M	1.6	0.44	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	140	M	3.3	0.91	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	37	D	16	3.8	ng/L		10	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	990	D	16	3.1	ng/L		10	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	23	D M	16	5.0	ng/L		10	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	170	D M	16	4.4	ng/L		10	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	96	D M	33	9.1	ng/L		10	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW104-01

Lab Sample ID: 320-42334-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	200	M	1.7	0.40	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1400	E	1.7	0.33	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	430	E	1.7	0.53	ng/L		1	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	610	E	1.7	0.47	ng/L		1	EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW104-01 (Continued)

Lab Sample ID: 320-42334-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	390	E M	3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	16	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1700	D	35	6.6	ng/L	20		EPA 537 (Mod)	Total/NA
- DL									
Perfluoroheptanoic acid (PFHpA) - DL	430	D	35	11	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	710	D M	35	9.4	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	390	D M	70	19	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - DL	15	J D M	35	9.0	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	190	H M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	1200	H E	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	410	H E M	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	550	H E M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	260	H	3.5	0.95	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - RE	15	H M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - REDL	1600	H D	35	6.6	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - REDL	430	H D	35	11	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - REDL	630	H D	35	9.4	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - REDL	270	H D	69	19	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - REDL	12	J H D M	35	9.0	ng/L	20		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW105-01

Lab Sample ID: 320-42334-11

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	33	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	300		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	30	M	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	47	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	830	E	3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	31	D	17	3.9	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	330	D	17	3.2	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	35	D	17	5.2	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	47	D M	17	4.6	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	980	D	34	9.3	ng/L	10		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW106-01

Lab Sample ID: 320-42334-12

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.5	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	13		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	14	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	12		3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	2.8	H M	1.8	0.40	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW106-01 (Continued)

Lab Sample ID: 320-42334-12

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS) - RE	12	H	1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	6.8	H	1.8	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	12	H M	1.8	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	11	H	3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW107-01

Lab Sample ID: 320-42334-13

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	71		1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	380	E M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	18		1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	210	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	30		3.4	0.95	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	58	D	17	4.0	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	460	D	17	3.3	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	16	J D M	17	5.2	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	230	D M	17	4.6	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	34	D	34	9.5	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - DL	19	D	17	4.5	ng/L	10		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW108-01

Lab Sample ID: 320-42334-14

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	13	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	240		1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3		1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	24	M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	15		3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW109-01

Lab Sample ID: 320-42334-15

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	6.1	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	140		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.5		1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	12	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	45		3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.87	J M	1.7	0.44	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW110-01

Lab Sample ID: 320-42334-16

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	77	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	67	M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.6	J M	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	3.8	M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.96	J M	3.5	0.95	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW111-01

Lab Sample ID: 320-42334-17

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	120		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	120		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	19		1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	18	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.6	M	3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW112-01

Lab Sample ID: 320-42334-18

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.6	J M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.3		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.68	J M	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.83	J M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.2		3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW113-01

Lab Sample ID: 320-42334-19

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.4	M	1.6	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.1	M	1.6	0.31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1	J	1.6	0.50	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.70	J M	1.6	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6	J M	3.3	0.91	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW114-01

Lab Sample ID: 320-42334-20

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.57	J	1.6	0.36	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	1.6	0.30	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.2	M	3.1	0.86	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-01

Lab Sample ID: 320-42334-1

Date Collected: 08/17/18 11:56

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8		1.7	0.39	ng/L		08/27/18 09:27	08/29/18 17:06	1
Perfluorohexanesulfonic acid (PFHxS)	15		1.7	0.32	ng/L		08/27/18 09:27	08/29/18 17:06	1
Perfluoroheptanoic acid (PFHpA)	0.75	J	1.7	0.52	ng/L		08/27/18 09:27	08/29/18 17:06	1
Perfluorooctanoic acid (PFOA)	1.8	M	1.7	0.46	ng/L		08/27/18 09:27	08/29/18 17:06	1
Perfluorooctanesulfonic acid (PFOS)	310		3.4	0.93	ng/L		08/27/18 09:27	08/29/18 17:06	1
Perfluorononanoic acid (PFNA)	1.3	U	1.7	0.44	ng/L		08/27/18 09:27	08/29/18 17:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	85		50 - 150				08/27/18 09:27	08/29/18 17:06	1
13C4-PFHpa	88		50 - 150				08/27/18 09:27	08/29/18 17:06	1
13C4 PFOA	84		50 - 150				08/27/18 09:27	08/29/18 17:06	1
13C3-PFBS	82		50 - 150				08/27/18 09:27	08/29/18 17:06	1
13C4 PFOS	77		50 - 150				08/27/18 09:27	08/29/18 17:06	1
13C5 PFNA	76		50 - 150				08/27/18 09:27	08/29/18 17:06	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-02

Lab Sample ID: 320-42334-2

Date Collected: 08/17/18 13:06

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.1	M	1.8	0.40	ng/L		08/27/18 09:27	08/29/18 19:36	1
Perfluorohexanesulfonic acid (PFHxS)	24		1.8	0.33	ng/L		08/27/18 09:27	08/29/18 19:36	1
Perfluoroheptanoic acid (PFHpA)	1.3	J	1.8	0.53	ng/L		08/27/18 09:27	08/29/18 19:36	1
Perfluorooctanoic acid (PFOA)	2.9	M	1.8	0.47	ng/L		08/27/18 09:27	08/29/18 19:36	1
Perfluorooctanesulfonic acid (PFOS)	480	E	3.5	0.96	ng/L		08/27/18 09:27	08/29/18 19:36	1
Perfluorononanoic acid (PFNA)	0.56	J	1.8	0.46	ng/L		08/27/18 09:27	08/29/18 19:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	65		50 - 150				08/27/18 09:27	08/29/18 19:36	1
13C4-PFHpA	69		50 - 150				08/27/18 09:27	08/29/18 19:36	1
13C4 PFOA	69		50 - 150				08/27/18 09:27	08/29/18 19:36	1
13C3-PFBS	64		50 - 150				08/27/18 09:27	08/29/18 19:36	1
13C4 PFOS	61		50 - 150				08/27/18 09:27	08/29/18 19:36	1
13C5 PFNA	66		50 - 150				08/27/18 09:27	08/29/18 19:36	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	8.8	U	18	4.0	ng/L		08/27/18 09:27	08/29/18 17:13	10
Perfluorohexanesulfonic acid (PFHxS)	25	D	18	3.3	ng/L		08/27/18 09:27	08/29/18 17:13	10
Perfluoroheptanoic acid (PFHpA)	13	U	18	5.3	ng/L		08/27/18 09:27	08/29/18 17:13	10
Perfluorooctanoic acid (PFOA)	13	U M	18	4.7	ng/L		08/27/18 09:27	08/29/18 17:13	10
Perfluorooctanesulfonic acid (PFOS)	530	D	35	9.6	ng/L		08/27/18 09:27	08/29/18 17:13	10
Perfluorononanoic acid (PFNA)	13	U	18	4.6	ng/L		08/27/18 09:27	08/29/18 17:13	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	60		50 - 150				08/27/18 09:27	08/29/18 17:13	10
18O2 PFHxS	59		50 - 150				08/27/18 09:27	08/29/18 17:13	10
13C4-PFHpA	64		50 - 150				08/27/18 09:27	08/29/18 17:13	10
13C4 PFOA	62		50 - 150				08/27/18 09:27	08/29/18 17:13	10
13C3-PFBS	62		50 - 150				08/27/18 09:27	08/29/18 17:13	10
13C4 PFOS	55		50 - 150				08/27/18 09:27	08/29/18 17:13	10
13C5 PFNA	68		50 - 150				08/27/18 09:27	08/29/18 17:13	10

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-03

Lab Sample ID: 320-42334-3

Date Collected: 08/17/18 13:43

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.5		1.7	0.39	ng/L		08/27/18 09:27	08/29/18 19:43	1
Perfluorohexanesulfonic acid (PFHxS)	48		1.7	0.32	ng/L		08/27/18 09:27	08/29/18 19:43	1
Perfluoroheptanoic acid (PFHpA)	2.8		1.7	0.51	ng/L		08/27/18 09:27	08/29/18 19:43	1
Perfluorooctanoic acid (PFOA)	6.4	M	1.7	0.46	ng/L		08/27/18 09:27	08/29/18 19:43	1
Perfluorooctanesulfonic acid (PFOS)	700	E	3.4	0.93	ng/L		08/27/18 09:27	08/29/18 19:43	1
Perfluorononanoic acid (PFNA)	0.73	J M	1.7	0.44	ng/L		08/27/18 09:27	08/29/18 19:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	49	Q	50 - 150				08/27/18 09:27	08/29/18 19:43	1
13C4-PFHpA	52		50 - 150				08/27/18 09:27	08/29/18 19:43	1
13C4 PFOA	50		50 - 150				08/27/18 09:27	08/29/18 19:43	1
13C3-PFBS	48	Q	50 - 150				08/27/18 09:27	08/29/18 19:43	1
13C4 PFOS	46	Q	50 - 150				08/27/18 09:27	08/29/18 19:43	1
13C5 PFNA	47	Q	50 - 150				08/27/18 09:27	08/29/18 19:43	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	10	J D	17	3.9	ng/L		08/27/18 09:27	08/29/18 17:21	10
Perfluorohexanesulfonic acid (PFHxS)	49	D	17	3.2	ng/L		08/27/18 09:27	08/29/18 17:21	10
Perfluoroheptanoic acid (PFHpA)	13	U	17	5.1	ng/L		08/27/18 09:27	08/29/18 17:21	10
Perfluorooctanoic acid (PFOA)	6.5	J D M	17	4.6	ng/L		08/27/18 09:27	08/29/18 17:21	10
Perfluorooctanesulfonic acid (PFOS)	810	D	34	9.3	ng/L		08/27/18 09:27	08/29/18 17:21	10
Perfluorononanoic acid (PFNA)	13	U	17	4.4	ng/L		08/27/18 09:27	08/29/18 17:21	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	42	Q	50 - 150				08/27/18 09:27	08/29/18 17:21	10
13C4-PFHpA	48	Q	50 - 150				08/27/18 09:27	08/29/18 17:21	10
13C4 PFOA	50		50 - 150				08/27/18 09:27	08/29/18 17:21	10
13C3-PFBS	40	Q M	50 - 150				08/27/18 09:27	08/29/18 17:21	10
13C4 PFOS	38	Q	50 - 150				08/27/18 09:27	08/29/18 17:21	10
13C5 PFNA	47	Q	50 - 150				08/27/18 09:27	08/29/18 17:21	10

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.2	H M	1.8	0.40	ng/L		09/05/18 10:22	09/06/18 10:50	1
Perfluorohexanesulfonic acid (PFHxS)	45	H	1.8	0.33	ng/L		09/05/18 10:22	09/06/18 10:50	1
Perfluoroheptanoic acid (PFHpA)	2.8	H	1.8	0.54	ng/L		09/05/18 10:22	09/06/18 10:50	1
Perfluorooctanoic acid (PFOA)	5.8	H M	1.8	0.48	ng/L		09/05/18 10:22	09/06/18 10:50	1
Perfluorooctanesulfonic acid (PFOS)	650	H E	3.5	0.97	ng/L		09/05/18 10:22	09/06/18 10:50	1
Perfluorononanoic acid (PFNA)	0.67	J H M	1.8	0.46	ng/L		09/05/18 10:22	09/06/18 10:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	79		50 - 150				09/05/18 10:22	09/06/18 10:50	1
13C4-PFHpA	78		50 - 150				09/05/18 10:22	09/06/18 10:50	1
13C4 PFOA	78		50 - 150				09/05/18 10:22	09/06/18 10:50	1

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-03

Lab Sample ID: 320-42334-3

Date Collected: 08/17/18 13:43

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C3-PFBS	81		50 - 150	09/05/18 10:22	09/06/18 10:50	1
13C4 PFOS	74		50 - 150	09/05/18 10:22	09/06/18 10:50	1
13C5 PFNA	73		50 - 150	09/05/18 10:22	09/06/18 10:50	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - REDL

<i>Analyte</i>	<i>Result</i>	<i>Qualifier</i>	<i>LOQ</i>	<i>DL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluorobutanesulfonic acid (PFBS)	11	J H D M	18	4.0	ng/L		09/05/18 10:22	09/06/18 10:12	10
Perfluorohexanesulfonic acid (PFHxS)	45	H D	18	3.3	ng/L		09/05/18 10:22	09/06/18 10:12	10
Perfluoroheptanoic acid (PFHpA)	13	U H M	18	5.4	ng/L		09/05/18 10:22	09/06/18 10:12	10
Perfluorooctanoic acid (PFOA)	6.4	J H D M	18	4.8	ng/L		09/05/18 10:22	09/06/18 10:12	10
Perfluorooctanesulfonic acid (PFOS)	670	H D	35	9.7	ng/L		09/05/18 10:22	09/06/18 10:12	10
Perfluorononanoic acid (PFNA)	13	U H	18	4.6	ng/L		09/05/18 10:22	09/06/18 10:12	10

<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	73		50 - 150	09/05/18 10:22	09/06/18 10:12	10
13C4-PFHpA	76		50 - 150	09/05/18 10:22	09/06/18 10:12	10
13C4 PFOA	73		50 - 150	09/05/18 10:22	09/06/18 10:12	10
13C3-PFBS	67		50 - 150	09/05/18 10:22	09/06/18 10:12	10
13C4 PFOS	73		50 - 150	09/05/18 10:22	09/06/18 10:12	10
13C5 PFNA	75		50 - 150	09/05/18 10:22	09/06/18 10:12	10

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-04

Lab Sample ID: 320-42334-4

Date Collected: 08/17/18 14:18

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	140		1.7	0.39	ng/L		08/27/18 09:27	08/29/18 19:51	1
Perfluorohexanesulfonic acid (PFHxS)	310		1.7	0.32	ng/L		08/27/18 09:27	08/29/18 19:51	1
Perfluoroheptanoic acid (PFHpA)	10	M	1.7	0.52	ng/L		08/27/18 09:27	08/29/18 19:51	1
Perfluorooctanoic acid (PFOA)	36	M	1.7	0.46	ng/L		08/27/18 09:27	08/29/18 19:51	1
Perfluorooctanesulfonic acid (PFOS)	2700	E	3.4	0.94	ng/L		08/27/18 09:27	08/29/18 19:51	1
Perfluorononanoic acid (PFNA)	2.9	M	1.7	0.44	ng/L		08/27/18 09:27	08/29/18 19:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	73		50 - 150				08/27/18 09:27	08/29/18 19:51	1
13C4-PFHpA	75		50 - 150				08/27/18 09:27	08/29/18 19:51	1
13C4 PFOA	73		50 - 150				08/27/18 09:27	08/29/18 19:51	1
13C3-PFBS	74		50 - 150				08/27/18 09:27	08/29/18 19:51	1
13C4 PFOS	58		50 - 150				08/27/18 09:27	08/29/18 19:51	1
13C5 PFNA	61		50 - 150				08/27/18 09:27	08/29/18 19:51	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	330	D	85	16	ng/L		08/27/18 09:27	08/29/18 17:28	50
Perfluoroheptanoic acid (PFHpA)	64	U	85	26	ng/L		08/27/18 09:27	08/29/18 17:28	50
Perfluorooctanoic acid (PFOA)	41	J D M	85	23	ng/L		08/27/18 09:27	08/29/18 17:28	50
Perfluorooctanesulfonic acid (PFOS)	4000	D	170	47	ng/L		08/27/18 09:27	08/29/18 17:28	50
Perfluorononanoic acid (PFNA)	64	U M	85	22	ng/L		08/27/18 09:27	08/29/18 17:28	50
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	62		50 - 150				08/27/18 09:27	08/29/18 17:28	50
18O2 PFHxS	61		50 - 150				08/27/18 09:27	08/29/18 17:28	50
13C4-PFHpA	66		50 - 150				08/27/18 09:27	08/29/18 17:28	50
13C4 PFOA	71		50 - 150				08/27/18 09:27	08/29/18 17:28	50
13C4 PFOS	62		50 - 150				08/27/18 09:27	08/29/18 17:28	50
13C5 PFNA	68		50 - 150				08/27/18 09:27	08/29/18 17:28	50

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-05

Lab Sample ID: 320-42334-5

Date Collected: 08/17/18 14:52

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4600	D	170	39	ng/L		08/27/18 09:27	08/29/18 17:36	100
Perfluorohexanesulfonic acid (PFHxS)	48000	E D	170	32	ng/L		08/27/18 09:27	08/29/18 17:36	100
Perfluoroheptanoic acid (PFHpA)	3200	D	170	51	ng/L		08/27/18 09:27	08/29/18 17:36	100
Perfluorooctanoic acid (PFOA)	7600	D M	170	46	ng/L		08/27/18 09:27	08/29/18 17:36	100
Perfluorooctanesulfonic acid (PFOS)	420000	E D	340	93	ng/L		08/27/18 09:27	08/29/18 17:36	100
Perfluorononanoic acid (PFNA)	900	D M	170	44	ng/L		08/27/18 09:27	08/29/18 17:36	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		50 - 150				08/27/18 09:27	08/29/18 17:36	100
13C4-PFHpa	73		50 - 150				08/27/18 09:27	08/29/18 17:36	100
13C4 PFOA	77		50 - 150				08/27/18 09:27	08/29/18 17:36	100
13C3-PFBS	140	M	50 - 150				08/27/18 09:27	08/29/18 17:36	100
13C4 PFOS	52		50 - 150				08/27/18 09:27	08/29/18 17:36	100
13C5 PFNA	49	Q	50 - 150				08/27/18 09:27	08/29/18 17:36	100

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	8500	H	100	23	ng/L		09/05/18 10:22	09/06/18 11:20	1
Perfluorohexanesulfonic acid (PFHxS)	64000	H E	100	19	ng/L		09/05/18 10:22	09/06/18 11:20	1
Perfluoroheptanoic acid (PFHpA)	3500	H	100	31	ng/L		09/05/18 10:22	09/06/18 11:20	1
Perfluorooctanoic acid (PFOA)	8000	H	100	27	ng/L		09/05/18 10:22	09/06/18 11:20	1
Perfluorooctanesulfonic acid (PFOS)	320000	H E	200	55	ng/L		09/05/18 10:22	09/06/18 11:20	1
Perfluorononanoic acid (PFNA)	800	H M	100	26	ng/L		09/05/18 10:22	09/06/18 11:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	93		50 - 150				09/05/18 10:22	09/06/18 11:20	1
13C4-PFHpa	95		50 - 150				09/05/18 10:22	09/06/18 11:20	1
13C4 PFOA	92		50 - 150				09/05/18 10:22	09/06/18 11:20	1
13C3-PFBS	100		50 - 150				09/05/18 10:22	09/06/18 11:20	1
13C4 PFOS	59		50 - 150				09/05/18 10:22	09/06/18 11:20	1
13C5 PFNA	60		50 - 150				09/05/18 10:22	09/06/18 11:20	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - REDL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	95000	H D	10000	1900	ng/L		09/05/18 10:22	09/06/18 10:20	100
Perfluoroheptanoic acid (PFHpA)	3500	J H D	10000	3100	ng/L		09/05/18 10:22	09/06/18 10:20	100
Perfluorooctanoic acid (PFOA)	6400	J H D M	10000	2700	ng/L		09/05/18 10:22	09/06/18 10:20	100
Perfluorooctanesulfonic acid (PFOS)	990000	H D	20000	5500	ng/L		09/05/18 10:22	09/06/18 10:20	100
Perfluorononanoic acid (PFNA)	7500	U H M	10000	2600	ng/L		09/05/18 10:22	09/06/18 10:20	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	85		50 - 150				09/05/18 10:22	09/06/18 10:20	100
13C4-PFHpa	88		50 - 150				09/05/18 10:22	09/06/18 10:20	100
13C4 PFOA	105		50 - 150				09/05/18 10:22	09/06/18 10:20	100
13C4 PFOS	77		50 - 150				09/05/18 10:22	09/06/18 10:20	100
13C5 PFNA	86		50 - 150				09/05/18 10:22	09/06/18 10:20	100

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-06

Lab Sample ID: 320-42334-6

Date Collected: 08/17/18 12:31

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8		1.7	0.39	ng/L		08/27/18 09:27	08/29/18 20:06	1
Perfluorohexanesulfonic acid (PFHxS)	16		1.7	0.32	ng/L		08/27/18 09:27	08/29/18 20:06	1
Perfluoroheptanoic acid (PFHpA)	0.79	J M	1.7	0.52	ng/L		08/27/18 09:27	08/29/18 20:06	1
Perfluorooctanoic acid (PFOA)	1.9	M	1.7	0.46	ng/L		08/27/18 09:27	08/29/18 20:06	1
Perfluorooctanesulfonic acid (PFOS)	360	E	3.4	0.93	ng/L		08/27/18 09:27	08/29/18 20:06	1
Perfluorononanoic acid (PFNA)	0.44	J M	1.7	0.44	ng/L		08/27/18 09:27	08/29/18 20:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	81		50 - 150				08/27/18 09:27	08/29/18 20:06	1
13C4-PFHxS	81		50 - 150				08/27/18 09:27	08/29/18 20:06	1
13C4 PFOA	81		50 - 150				08/27/18 09:27	08/29/18 20:06	1
13C3-PFBS	80		50 - 150				08/27/18 09:27	08/29/18 20:06	1
13C4 PFOS	72		50 - 150				08/27/18 09:27	08/29/18 20:06	1
13C5 PFNA	82		50 - 150				08/27/18 09:27	08/29/18 20:06	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	8.4	U	17	3.9	ng/L		08/27/18 09:27	08/29/18 17:51	10
Perfluorohexanesulfonic acid (PFHxS)	15	J D	17	3.2	ng/L		08/27/18 09:27	08/29/18 17:51	10
Perfluoroheptanoic acid (PFHpA)	13	U	17	5.2	ng/L		08/27/18 09:27	08/29/18 17:51	10
Perfluorooctanoic acid (PFOA)	13	U M	17	4.6	ng/L		08/27/18 09:27	08/29/18 17:51	10
Perfluorooctanesulfonic acid (PFOS)	330	D	34	9.3	ng/L		08/27/18 09:27	08/29/18 17:51	10
Perfluorononanoic acid (PFNA)	13	U	17	4.4	ng/L		08/27/18 09:27	08/29/18 17:51	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	75		50 - 150				08/27/18 09:27	08/29/18 17:51	10
13C4-PFHxS	79		50 - 150				08/27/18 09:27	08/29/18 17:51	10
13C4 PFOA	79		50 - 150				08/27/18 09:27	08/29/18 17:51	10
13C3-PFBS	85		50 - 150				08/27/18 09:27	08/29/18 17:51	10
13C4 PFOS	67		50 - 150				08/27/18 09:27	08/29/18 17:51	10
13C5 PFNA	79		50 - 150				08/27/18 09:27	08/29/18 17:51	10

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-07

Lab Sample ID: 320-42334-7

Date Collected: 08/17/18 14:53

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	57000	E D	170	33	ng/L		08/27/18 09:27	08/29/18 18:06	100
Perfluoroheptanoic acid (PFHpA)	3000	D	170	53	ng/L		08/27/18 09:27	08/29/18 18:06	100
Perfluorooctanoic acid (PFOA)	7400	D M	170	47	ng/L		08/27/18 09:27	08/29/18 18:06	100
Perfluorooctanesulfonic acid (PFOS)	660000	E D	350	95	ng/L		08/27/18 09:27	08/29/18 18:06	100
Perfluorononanoic acid (PFNA)	910	D	170	45	ng/L		08/27/18 09:27	08/29/18 18:06	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	70		50 - 150				08/27/18 09:27	08/29/18 18:06	100
13C4-PFHpA	54		50 - 150				08/27/18 09:27	08/29/18 18:06	100
13C4 PFOA	56		50 - 150				08/27/18 09:27	08/29/18 18:06	100
13C4 PFOS	30	Q	50 - 150				08/27/18 09:27	08/29/18 18:06	100
13C5 PFNA	36	Q	50 - 150				08/27/18 09:27	08/29/18 18:06	100

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9000	H	100	23	ng/L		09/05/18 10:22	09/06/18 11:27	1
Perfluorohexanesulfonic acid (PFHxS)	69000	H E	100	19	ng/L		09/05/18 10:22	09/06/18 11:27	1
Perfluoroheptanoic acid (PFHpA)	3400	H	100	31	ng/L		09/05/18 10:22	09/06/18 11:27	1
Perfluorooctanoic acid (PFOA)	8100	H	100	27	ng/L		09/05/18 10:22	09/06/18 11:27	1
Perfluorooctanesulfonic acid (PFOS)	330000	H E	200	55	ng/L		09/05/18 10:22	09/06/18 11:27	1
Perfluorononanoic acid (PFNA)	830	H M	100	26	ng/L		09/05/18 10:22	09/06/18 11:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	88		50 - 150				09/05/18 10:22	09/06/18 11:27	1
13C4-PFHpA	93		50 - 150				09/05/18 10:22	09/06/18 11:27	1
13C4 PFOA	91		50 - 150				09/05/18 10:22	09/06/18 11:27	1
13C3-PFBS	97		50 - 150				09/05/18 10:22	09/06/18 11:27	1
13C4 PFOS	59		50 - 150				09/05/18 10:22	09/06/18 11:27	1
13C5 PFNA	58		50 - 150				09/05/18 10:22	09/06/18 11:27	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - REDL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	97000	H D	10000	1900	ng/L		09/05/18 10:22	09/06/18 10:27	100
Perfluoroheptanoic acid (PFHpA)	3200	J H D	10000	3100	ng/L		09/05/18 10:22	09/06/18 10:27	100
Perfluorooctanoic acid (PFOA)	7000	J H D M	10000	2700	ng/L		09/05/18 10:22	09/06/18 10:27	100
Perfluorooctanesulfonic acid (PFOS)	850000	H D	20000	5500	ng/L		09/05/18 10:22	09/06/18 10:27	100
Perfluorononanoic acid (PFNA)	7500	U H	10000	2600	ng/L		09/05/18 10:22	09/06/18 10:27	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	90		50 - 150				09/05/18 10:22	09/06/18 10:27	100
13C4-PFHpA	100		50 - 150				09/05/18 10:22	09/06/18 10:27	100
13C4 PFOA	123		50 - 150				09/05/18 10:22	09/06/18 10:27	100
13C4 PFOS	102		50 - 150				09/05/18 10:22	09/06/18 10:27	100
13C5 PFNA	100		50 - 150				09/05/18 10:22	09/06/18 10:27	100

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW102-01

Lab Sample ID: 320-42334-8

Date Collected: 08/18/18 11:37

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.5		1.8	0.40	ng/L		08/27/18 09:27	08/29/18 18:21	1
Perfluorohexanesulfonic acid (PFHxS)	4.5	M	1.8	0.33	ng/L		08/27/18 09:27	08/29/18 18:21	1
Perfluoroheptanoic acid (PFHpA)	1.3	U M	1.8	0.54	ng/L		08/27/18 09:27	08/29/18 18:21	1
Perfluorooctanoic acid (PFOA)	0.71	J M	1.8	0.47	ng/L		08/27/18 09:27	08/29/18 18:21	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U M	3.5	0.97	ng/L		08/27/18 09:27	08/29/18 18:21	1
Perfluorononanoic acid (PFNA)	1.3	U	1.8	0.46	ng/L		08/27/18 09:27	08/29/18 18:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	95		50 - 150				08/27/18 09:27	08/29/18 18:21	1
13C4-PFHpA	92		50 - 150				08/27/18 09:27	08/29/18 18:21	1
13C4 PFOA	99		50 - 150				08/27/18 09:27	08/29/18 18:21	1
13C3-PFBS	84		50 - 150				08/27/18 09:27	08/29/18 18:21	1
13C4 PFOS	89		50 - 150				08/27/18 09:27	08/29/18 18:21	1
13C5 PFNA	92		50 - 150				08/27/18 09:27	08/29/18 18:21	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW103-01

Lab Sample ID: 320-42334-9

Date Collected: 08/14/18 18:03

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	35	M	1.6	0.38	ng/L		08/27/18 09:27	08/29/18 20:21	1
Perfluorohexanesulfonic acid (PFHxS)	790	E	1.6	0.31	ng/L		08/27/18 09:27	08/29/18 20:21	1
Perfluoroheptanoic acid (PFHpA)	24		1.6	0.50	ng/L		08/27/18 09:27	08/29/18 20:21	1
Perfluorooctanoic acid (PFOA)	180	M	1.6	0.44	ng/L		08/27/18 09:27	08/29/18 20:21	1
Perfluorooctanesulfonic acid (PFOS)	140	M	3.3	0.91	ng/L		08/27/18 09:27	08/29/18 20:21	1
Perfluorononanoic acid (PFNA)	1.2	U M	1.6	0.43	ng/L		08/27/18 09:27	08/29/18 20:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	62		50 - 150				08/27/18 09:27	08/29/18 20:21	1
13C4-PFHpA	61		50 - 150				08/27/18 09:27	08/29/18 20:21	1
13C4 PFOA	66		50 - 150				08/27/18 09:27	08/29/18 20:21	1
13C3-PFBS	61		50 - 150				08/27/18 09:27	08/29/18 20:21	1
13C4 PFOS	57		50 - 150				08/27/18 09:27	08/29/18 20:21	1
13C5 PFNA	68		50 - 150				08/27/18 09:27	08/29/18 20:21	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	37	D	16	3.8	ng/L		08/27/18 09:27	08/29/18 18:28	10
Perfluorohexanesulfonic acid (PFHxS)	990	D	16	3.1	ng/L		08/27/18 09:27	08/29/18 18:28	10
Perfluoroheptanoic acid (PFHpA)	23	D M	16	5.0	ng/L		08/27/18 09:27	08/29/18 18:28	10
Perfluorooctanoic acid (PFOA)	170	D M	16	4.4	ng/L		08/27/18 09:27	08/29/18 18:28	10
Perfluorooctanesulfonic acid (PFOS)	96	D M	33	9.1	ng/L		08/27/18 09:27	08/29/18 18:28	10
Perfluorononanoic acid (PFNA)	12	U M	16	4.3	ng/L		08/27/18 09:27	08/29/18 18:28	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	59		50 - 150				08/27/18 09:27	08/29/18 18:28	10
13C4-PFHpA	67		50 - 150				08/27/18 09:27	08/29/18 18:28	10
13C4 PFOA	65		50 - 150				08/27/18 09:27	08/29/18 18:28	10
13C3-PFBS	58		50 - 150				08/27/18 09:27	08/29/18 18:28	10
13C4 PFOS	55		50 - 150				08/27/18 09:27	08/29/18 18:28	10
13C5 PFNA	66		50 - 150				08/27/18 09:27	08/29/18 18:28	10

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW104-01

Lab Sample ID: 320-42334-10

Date Collected: 08/18/18 10:34

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	200	M	1.7	0.40	ng/L		08/27/18 09:27	08/31/18 16:44	1
Perfluorohexanesulfonic acid (PFHxS)	1400	E	1.7	0.33	ng/L		08/27/18 09:27	08/31/18 16:44	1
Perfluoroheptanoic acid (PFHpA)	430	E	1.7	0.53	ng/L		08/27/18 09:27	08/31/18 16:44	1
Perfluorooctanoic acid (PFOA)	610	E	1.7	0.47	ng/L		08/27/18 09:27	08/31/18 16:44	1
Perfluorooctanesulfonic acid (PFOS)	390	E M	3.5	0.96	ng/L		08/27/18 09:27	08/31/18 16:44	1
Perfluorononanoic acid (PFNA)	16	M	1.7	0.45	ng/L		08/27/18 09:27	08/31/18 16:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	48	Q	50 - 150				08/27/18 09:27	08/31/18 16:44	1
13C4-PFHpA	41	Q	50 - 150				08/27/18 09:27	08/31/18 16:44	1
13C4 PFOA	47	Q	50 - 150				08/27/18 09:27	08/31/18 16:44	1
13C3-PFBS	40	Q	50 - 150				08/27/18 09:27	08/31/18 16:44	1
13C4 PFOS	43	Q	50 - 150				08/27/18 09:27	08/31/18 16:44	1
13C5 PFNA	51		50 - 150				08/27/18 09:27	08/31/18 16:44	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	1700	D	35	6.6	ng/L		08/27/18 09:27	08/29/18 18:36	20
Perfluoroheptanoic acid (PFHpA)	430	D	35	11	ng/L		08/27/18 09:27	08/29/18 18:36	20
Perfluorooctanoic acid (PFOA)	710	D M	35	9.4	ng/L		08/27/18 09:27	08/29/18 18:36	20
Perfluorooctanesulfonic acid (PFOS)	390	D M	70	19	ng/L		08/27/18 09:27	08/29/18 18:36	20
Perfluorononanoic acid (PFNA)	15	J D M	35	9.0	ng/L		08/27/18 09:27	08/29/18 18:36	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	46	Q	50 - 150				08/27/18 09:27	08/29/18 18:36	20
13C4-PFHpA	51		50 - 150				08/27/18 09:27	08/29/18 18:36	20
13C4 PFOA	49	Q	50 - 150				08/27/18 09:27	08/29/18 18:36	20
13C4 PFOS	32	Q	50 - 150				08/27/18 09:27	08/29/18 18:36	20
13C5 PFNA	43	Q	50 - 150				08/27/18 09:27	08/29/18 18:36	20

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	190	H M	1.7	0.40	ng/L		09/05/18 10:22	09/06/18 11:12	1
Perfluorohexanesulfonic acid (PFHxS)	1200	H E	1.7	0.33	ng/L		09/05/18 10:22	09/06/18 11:12	1
Perfluoroheptanoic acid (PFHpA)	410	H E M	1.7	0.53	ng/L		09/05/18 10:22	09/06/18 11:12	1
Perfluorooctanoic acid (PFOA)	550	H E M	1.7	0.47	ng/L		09/05/18 10:22	09/06/18 11:12	1
Perfluorooctanesulfonic acid (PFOS)	260	H	3.5	0.95	ng/L		09/05/18 10:22	09/06/18 11:12	1
Perfluorononanoic acid (PFNA)	15	H M	1.7	0.45	ng/L		09/05/18 10:22	09/06/18 11:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	76		50 - 150				09/05/18 10:22	09/06/18 11:12	1
13C4-PFHpA	58		50 - 150				09/05/18 10:22	09/06/18 11:12	1
13C4 PFOA	70		50 - 150				09/05/18 10:22	09/06/18 11:12	1
13C3-PFBS	58		50 - 150				09/05/18 10:22	09/06/18 11:12	1
13C4 PFOS	88		50 - 150				09/05/18 10:22	09/06/18 11:12	1
13C5 PFNA	79		50 - 150				09/05/18 10:22	09/06/18 11:12	1

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
 Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - REDL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	1600	H D	35	6.6	ng/L		09/05/18 10:22	09/06/18 10:35	20
Perfluoroheptanoic acid (PFHpA)	430	H D	35	11	ng/L		09/05/18 10:22	09/06/18 10:35	20
Perfluorooctanoic acid (PFOA)	630	H D	35	9.4	ng/L		09/05/18 10:22	09/06/18 10:35	20
Perfluorooctanesulfonic acid (PFOS)	270	H D	69	19	ng/L		09/05/18 10:22	09/06/18 10:35	20
Perfluorononanoic acid (PFNA)	12	J H D M	35	9.0	ng/L		09/05/18 10:22	09/06/18 10:35	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	69		50 - 150				09/05/18 10:22	09/06/18 10:35	20
13C4-PFHpA	71		50 - 150				09/05/18 10:22	09/06/18 10:35	20
13C4 PFOA	71		50 - 150				09/05/18 10:22	09/06/18 10:35	20
13C4 PFOS	63		50 - 150				09/05/18 10:22	09/06/18 10:35	20
13C5 PFNA	66		50 - 150				09/05/18 10:22	09/06/18 10:35	20



Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW105-01

Lab Sample ID: 320-42334-11

Date Collected: 08/18/18 14:42

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	33	M	1.7	0.39	ng/L		08/27/18 09:27	08/31/18 16:52	1
Perfluorohexanesulfonic acid (PFHxS)	300		1.7	0.32	ng/L		08/27/18 09:27	08/31/18 16:52	1
Perfluoroheptanoic acid (PFHpA)	30	M	1.7	0.52	ng/L		08/27/18 09:27	08/31/18 16:52	1
Perfluorooctanoic acid (PFOA)	47	M	1.7	0.46	ng/L		08/27/18 09:27	08/31/18 16:52	1
Perfluorooctanesulfonic acid (PFOS)	830	E	3.4	0.93	ng/L		08/27/18 09:27	08/31/18 16:52	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		08/27/18 09:27	08/31/18 16:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	86		50 - 150				08/27/18 09:27	08/31/18 16:52	1
13C4-PFHpA	90		50 - 150				08/27/18 09:27	08/31/18 16:52	1
13C4 PFOA	91		50 - 150				08/27/18 09:27	08/31/18 16:52	1
13C3-PFBS	82		50 - 150				08/27/18 09:27	08/31/18 16:52	1
13C4 PFOS	79		50 - 150				08/27/18 09:27	08/31/18 16:52	1
13C5 PFNA	89		50 - 150				08/27/18 09:27	08/31/18 16:52	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	31	D	17	3.9	ng/L		08/27/18 09:27	08/29/18 18:43	10
Perfluorohexanesulfonic acid (PFHxS)	330	D	17	3.2	ng/L		08/27/18 09:27	08/29/18 18:43	10
Perfluoroheptanoic acid (PFHpA)	35	D	17	5.2	ng/L		08/27/18 09:27	08/29/18 18:43	10
Perfluorooctanoic acid (PFOA)	47	D M	17	4.6	ng/L		08/27/18 09:27	08/29/18 18:43	10
Perfluorooctanesulfonic acid (PFOS)	980	D	34	9.3	ng/L		08/27/18 09:27	08/29/18 18:43	10
Perfluorononanoic acid (PFNA)	13	U M	17	4.4	ng/L		08/27/18 09:27	08/29/18 18:43	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	87		50 - 150				08/27/18 09:27	08/29/18 18:43	10
13C4-PFHpA	95		50 - 150				08/27/18 09:27	08/29/18 18:43	10
13C4 PFOA	90		50 - 150				08/27/18 09:27	08/29/18 18:43	10
13C3-PFBS	91		50 - 150				08/27/18 09:27	08/29/18 18:43	10
13C4 PFOS	81		50 - 150				08/27/18 09:27	08/29/18 18:43	10
13C5 PFNA	89		50 - 150				08/27/18 09:27	08/29/18 18:43	10

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW106-01

Lab Sample ID: 320-42334-12

Date Collected: 08/18/18 09:24

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.5	M	1.7	0.39	ng/L		08/27/18 09:27	08/29/18 18:51	1
Perfluorohexanesulfonic acid (PFHxS)	13		1.7	0.32	ng/L		08/27/18 09:27	08/29/18 18:51	1
Perfluoroheptanoic acid (PFHpA)	1.3	U M	1.7	0.52	ng/L		08/27/18 09:27	08/29/18 18:51	1
Perfluorooctanoic acid (PFOA)	14	M	1.7	0.46	ng/L		08/27/18 09:27	08/29/18 18:51	1
Perfluorooctanesulfonic acid (PFOS)	12		3.4	0.93	ng/L		08/27/18 09:27	08/29/18 18:51	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		08/27/18 09:27	08/29/18 18:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	33	Q	50 - 150				08/27/18 09:27	08/29/18 18:51	1
13C4-PFHpA	35	Q	50 - 150				08/27/18 09:27	08/29/18 18:51	1
13C4 PFOA	34	Q	50 - 150				08/27/18 09:27	08/29/18 18:51	1
13C3-PFBS	35	Q	50 - 150				08/27/18 09:27	08/29/18 18:51	1
13C4 PFOS	29	Q	50 - 150				08/27/18 09:27	08/29/18 18:51	1
13C5 PFNA	34	Q	50 - 150				08/27/18 09:27	08/29/18 18:51	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.8	H M	1.8	0.40	ng/L		09/05/18 10:22	09/06/18 10:42	1
Perfluorohexanesulfonic acid (PFHxS)	12	H	1.8	0.33	ng/L		09/05/18 10:22	09/06/18 10:42	1
Perfluoroheptanoic acid (PFHpA)	6.8	H	1.8	0.53	ng/L		09/05/18 10:22	09/06/18 10:42	1
Perfluorooctanoic acid (PFOA)	12	H M	1.8	0.47	ng/L		09/05/18 10:22	09/06/18 10:42	1
Perfluorooctanesulfonic acid (PFOS)	11	H	3.5	0.96	ng/L		09/05/18 10:22	09/06/18 10:42	1
Perfluorononanoic acid (PFNA)	1.3	U H M	1.8	0.46	ng/L		09/05/18 10:22	09/06/18 10:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	75		50 - 150				09/05/18 10:22	09/06/18 10:42	1
13C4-PFHpA	75		50 - 150				09/05/18 10:22	09/06/18 10:42	1
13C4 PFOA	76		50 - 150				09/05/18 10:22	09/06/18 10:42	1
13C3-PFBS	70		50 - 150				09/05/18 10:22	09/06/18 10:42	1
13C4 PFOS	67		50 - 150				09/05/18 10:22	09/06/18 10:42	1
13C5 PFNA	71		50 - 150				09/05/18 10:22	09/06/18 10:42	1

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW107-01

Lab Sample ID: 320-42334-13

Date Collected: 08/18/18 15:52

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	71		1.7	0.40	ng/L		08/27/18 09:27	08/31/18 16:59	1
Perfluorohexanesulfonic acid (PFHxS)	380	E M	1.7	0.33	ng/L		08/27/18 09:27	08/31/18 16:59	1
Perfluoroheptanoic acid (PFHpA)	18		1.7	0.52	ng/L		08/27/18 09:27	08/31/18 16:59	1
Perfluorooctanoic acid (PFOA)	210	M	1.7	0.46	ng/L		08/27/18 09:27	08/31/18 16:59	1
Perfluorooctanesulfonic acid (PFOS)	30		3.4	0.95	ng/L		08/27/18 09:27	08/31/18 16:59	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/27/18 09:27	08/31/18 16:59	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	86		50 - 150				08/27/18 09:27	08/31/18 16:59	1
13C4-PFHpA	85		50 - 150				08/27/18 09:27	08/31/18 16:59	1
13C4 PFOA	90		50 - 150				08/27/18 09:27	08/31/18 16:59	1
13C3-PFBS	80		50 - 150				08/27/18 09:27	08/31/18 16:59	1
13C4 PFOS	84		50 - 150				08/27/18 09:27	08/31/18 16:59	1
13C5 PFNA	88		50 - 150				08/27/18 09:27	08/31/18 16:59	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	58	D	17	4.0	ng/L		08/27/18 09:27	08/29/18 18:58	10
Perfluorohexanesulfonic acid (PFHxS)	460	D	17	3.3	ng/L		08/27/18 09:27	08/29/18 18:58	10
Perfluoroheptanoic acid (PFHpA)	16	J D M	17	5.2	ng/L		08/27/18 09:27	08/29/18 18:58	10
Perfluorooctanoic acid (PFOA)	230	D M	17	4.6	ng/L		08/27/18 09:27	08/29/18 18:58	10
Perfluorooctanesulfonic acid (PFOS)	34	D	34	9.5	ng/L		08/27/18 09:27	08/29/18 18:58	10
Perfluorononanoic acid (PFNA)	19	D	17	4.5	ng/L		08/27/18 09:27	08/29/18 18:58	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	84		50 - 150				08/27/18 09:27	08/29/18 18:58	10
13C4-PFHpA	95		50 - 150				08/27/18 09:27	08/29/18 18:58	10
13C4 PFOA	93		50 - 150				08/27/18 09:27	08/29/18 18:58	10
13C3-PFBS	100		50 - 150				08/27/18 09:27	08/29/18 18:58	10
13C4 PFOS	80		50 - 150				08/27/18 09:27	08/29/18 18:58	10
13C5 PFNA	87		50 - 150				08/27/18 09:27	08/29/18 18:58	10

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW108-01

Lab Sample ID: 320-42334-14

Date Collected: 08/17/18 18:00

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	13	M	1.7	0.40	ng/L		08/27/18 09:27	08/29/18 19:06	1
Perfluorohexanesulfonic acid (PFHxS)	240		1.7	0.33	ng/L		08/27/18 09:27	08/29/18 19:06	1
Perfluoroheptanoic acid (PFHpA)	2.3		1.7	0.53	ng/L		08/27/18 09:27	08/29/18 19:06	1
Perfluorooctanoic acid (PFOA)	24	M	1.7	0.47	ng/L		08/27/18 09:27	08/29/18 19:06	1
Perfluorooctanesulfonic acid (PFOS)	15		3.5	0.96	ng/L		08/27/18 09:27	08/29/18 19:06	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/27/18 09:27	08/29/18 19:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	58		50 - 150				08/27/18 09:27	08/29/18 19:06	1
13C4-PFHpA	59		50 - 150				08/27/18 09:27	08/29/18 19:06	1
13C4 PFOA	60		50 - 150				08/27/18 09:27	08/29/18 19:06	1
13C3-PFBS	60		50 - 150				08/27/18 09:27	08/29/18 19:06	1
13C4 PFOS	54		50 - 150				08/27/18 09:27	08/29/18 19:06	1
13C5 PFNA	61		50 - 150				08/27/18 09:27	08/29/18 19:06	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW109-01

Lab Sample ID: 320-42334-15

Date Collected: 08/17/18 19:09

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	6.1	M	1.7	0.39	ng/L		08/27/18 09:27	08/29/18 19:13	1
Perfluorohexanesulfonic acid (PFHxS)	140		1.7	0.32	ng/L		08/27/18 09:27	08/29/18 19:13	1
Perfluoroheptanoic acid (PFHpA)	6.5		1.7	0.51	ng/L		08/27/18 09:27	08/29/18 19:13	1
Perfluorooctanoic acid (PFOA)	12	M	1.7	0.45	ng/L		08/27/18 09:27	08/29/18 19:13	1
Perfluorooctanesulfonic acid (PFOS)	45		3.4	0.93	ng/L		08/27/18 09:27	08/29/18 19:13	1
Perfluorononanoic acid (PFNA)	0.87	J M	1.7	0.44	ng/L		08/27/18 09:27	08/29/18 19:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	88		50 - 150				08/27/18 09:27	08/29/18 19:13	1
13C4-PFHpA	89		50 - 150				08/27/18 09:27	08/29/18 19:13	1
13C4 PFOA	94		50 - 150				08/27/18 09:27	08/29/18 19:13	1
13C3-PFBS	84		50 - 150				08/27/18 09:27	08/29/18 19:13	1
13C4 PFOS	80		50 - 150				08/27/18 09:27	08/29/18 19:13	1
13C5 PFNA	84		50 - 150				08/27/18 09:27	08/29/18 19:13	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW110-01

Lab Sample ID: 320-42334-16

Date Collected: 08/17/18 16:54

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	77	M	1.7	0.40	ng/L		08/27/18 09:27	08/29/18 19:28	1
Perfluorohexanesulfonic acid (PFHxS)	67	M	1.7	0.33	ng/L		08/27/18 09:27	08/29/18 19:28	1
Perfluoroheptanoic acid (PFHpA)	1.6	J M	1.7	0.53	ng/L		08/27/18 09:27	08/29/18 19:28	1
Perfluorooctanoic acid (PFOA)	3.8	M	1.7	0.47	ng/L		08/27/18 09:27	08/29/18 19:28	1
Perfluorooctanesulfonic acid (PFOS)	0.96	J M	3.5	0.95	ng/L		08/27/18 09:27	08/29/18 19:28	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/27/18 09:27	08/29/18 19:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	79		50 - 150				08/27/18 09:27	08/29/18 19:28	1
13C4-PFHpA	79		50 - 150				08/27/18 09:27	08/29/18 19:28	1
13C4 PFOA	84		50 - 150				08/27/18 09:27	08/29/18 19:28	1
13C3-PFBS	65		50 - 150				08/27/18 09:27	08/29/18 19:28	1
13C4 PFOS	78		50 - 150				08/27/18 09:27	08/29/18 19:28	1
13C5 PFNA	86		50 - 150				08/27/18 09:27	08/29/18 19:28	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW111-01

Lab Sample ID: 320-42334-17

Date Collected: 08/15/18 15:34

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	120		1.7	0.39	ng/L		08/27/18 09:27	08/28/18 21:08	1
Perfluorohexanesulfonic acid (PFHxS)	120		1.7	0.32	ng/L		08/27/18 09:27	08/28/18 21:08	1
Perfluoroheptanoic acid (PFHpA)	19		1.7	0.51	ng/L		08/27/18 09:27	08/28/18 21:08	1
Perfluorooctanoic acid (PFOA)	18	M	1.7	0.45	ng/L		08/27/18 09:27	08/28/18 21:08	1
Perfluorooctanesulfonic acid (PFOS)	7.6	M	3.4	0.93	ng/L		08/27/18 09:27	08/28/18 21:08	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		08/27/18 09:27	08/28/18 21:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	67		50 - 150				08/27/18 09:27	08/28/18 21:08	1
13C4-PFHpA	72		50 - 150				08/27/18 09:27	08/28/18 21:08	1
13C4 PFOA	69		50 - 150				08/27/18 09:27	08/28/18 21:08	1
13C3-PFBS	66		50 - 150				08/27/18 09:27	08/28/18 21:08	1
13C4 PFOS	62		50 - 150				08/27/18 09:27	08/28/18 21:08	1
13C5 PFNA	64		50 - 150				08/27/18 09:27	08/28/18 21:08	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW112-01

Lab Sample ID: 320-42334-18

Date Collected: 08/14/18 11:43

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.6	J M	1.7	0.39	ng/L		08/27/18 09:27	08/28/18 21:16	1
Perfluorohexanesulfonic acid (PFHxS)	3.3		1.7	0.32	ng/L		08/27/18 09:27	08/28/18 21:16	1
Perfluoroheptanoic acid (PFHpA)	0.68	J M	1.7	0.52	ng/L		08/27/18 09:27	08/28/18 21:16	1
Perfluorooctanoic acid (PFOA)	0.83	J M	1.7	0.46	ng/L		08/27/18 09:27	08/28/18 21:16	1
Perfluorooctanesulfonic acid (PFOS)	4.2		3.4	0.93	ng/L		08/27/18 09:27	08/28/18 21:16	1
Perfluorononanoic acid (PFNA)	1.3	U	1.7	0.44	ng/L		08/27/18 09:27	08/28/18 21:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	94		50 - 150				08/27/18 09:27	08/28/18 21:16	1
13C4-PFHpA	94		50 - 150				08/27/18 09:27	08/28/18 21:16	1
13C4 PFOA	95		50 - 150				08/27/18 09:27	08/28/18 21:16	1
13C3-PFBS	81		50 - 150				08/27/18 09:27	08/28/18 21:16	1
13C4 PFOS	94		50 - 150				08/27/18 09:27	08/28/18 21:16	1
13C5 PFNA	93		50 - 150				08/27/18 09:27	08/28/18 21:16	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW113-01

Lab Sample ID: 320-42334-19

Date Collected: 08/14/18 10:05

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.4	M	1.6	0.38	ng/L		08/27/18 09:27	08/28/18 21:23	1
Perfluorohexanesulfonic acid (PFHxS)	2.1	M	1.6	0.31	ng/L		08/27/18 09:27	08/28/18 21:23	1
Perfluoroheptanoic acid (PFHpA)	1.1	J	1.6	0.50	ng/L		08/27/18 09:27	08/28/18 21:23	1
Perfluorooctanoic acid (PFOA)	0.70	J M	1.6	0.45	ng/L		08/27/18 09:27	08/28/18 21:23	1
Perfluorooctanesulfonic acid (PFOS)	1.6	J M	3.3	0.91	ng/L		08/27/18 09:27	08/28/18 21:23	1
Perfluorononanoic acid (PFNA)	1.2	U M	1.6	0.43	ng/L		08/27/18 09:27	08/28/18 21:23	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	88		50 - 150				08/27/18 09:27	08/28/18 21:23	1
13C4-PFHpA	91		50 - 150				08/27/18 09:27	08/28/18 21:23	1
13C4 PFOA	95		50 - 150				08/27/18 09:27	08/28/18 21:23	1
13C3-PFBS	80		50 - 150				08/27/18 09:27	08/28/18 21:23	1
13C4 PFOS	86		50 - 150				08/27/18 09:27	08/28/18 21:23	1
13C5 PFNA	88		50 - 150				08/27/18 09:27	08/28/18 21:23	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW114-01

Lab Sample ID: 320-42334-20

Date Collected: 08/13/18 18:31

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.57	J	1.6	0.36	ng/L		08/27/18 09:27	08/28/18 21:31	1
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	1.6	0.30	ng/L		08/27/18 09:27	08/28/18 21:31	1
Perfluoroheptanoic acid (PFHpA)	1.2	U	1.6	0.48	ng/L		08/27/18 09:27	08/28/18 21:31	1
Perfluorooctanoic acid (PFOA)	1.2	U M	1.6	0.42	ng/L		08/27/18 09:27	08/28/18 21:31	1
Perfluorooctanesulfonic acid (PFOS)	6.2	M	3.1	0.86	ng/L		08/27/18 09:27	08/28/18 21:31	1
Perfluorononanoic acid (PFNA)	1.2	U	1.6	0.41	ng/L		08/27/18 09:27	08/28/18 21:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	61		50 - 150				08/27/18 09:27	08/28/18 21:31	1
13C4-PFHpA	63		50 - 150				08/27/18 09:27	08/28/18 21:31	1
13C4 PFOA	62		50 - 150				08/27/18 09:27	08/28/18 21:31	1
13C3-PFBS	55		50 - 150				08/27/18 09:27	08/28/18 21:31	1
13C4 PFOS	55		50 - 150				08/27/18 09:27	08/28/18 21:31	1
13C5 PFNA	63		50 - 150				08/27/18 09:27	08/28/18 21:31	1

Isotope Dilution Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)						
		PFHxA (50-150)	PFHxS (50-150)	PFHpA (50-150)	PFOA (50-150)	3C3-PFB! (50-150)	PFOS (50-150)	PFNA (50-150)
320-42334-1	FAI18-TW101-01		85	88	84	82	77	76
320-42334-2	FAI18-TW101-02		65	69	69	64	61	66
320-42334-2 - DL	FAI18-TW101-02	60	59	64	62	62	55	68
320-42334-3	FAI18-TW101-03		49 Q	52	50	48 Q	46 Q	47 Q
320-42334-3 - DL	FAI18-TW101-03		42 Q	48 Q	50	40 Q M	38 Q	47 Q
320-42334-3 - RE	FAI18-TW101-03		79	78	78	81	74	73
320-42334-3 - REDL	FAI18-TW101-03		73	76	73	67	73	75
320-42334-4 - DL	FAI18-TW101-04	62	61	66	71		62	68
320-42334-4	FAI18-TW101-04		73	75	73	74	58	61
320-42334-5	FAI18-TW101-05		110	73	77	140 M	52	49 Q
320-42334-5 - RE	FAI18-TW101-05		93	95	92	100	59	60
320-42334-5 - REDL	FAI18-TW101-05		85	88	105		77	86
320-42334-6 - DL	FAI18-TW101-06		75	79	79	85	67	79
320-42334-6	FAI18-TW101-06		81	81	81	80	72	82
320-42334-7	FAI18-TW101-07		70	54	56		30 Q	36 Q
320-42334-7 - RE	FAI18-TW101-07		88	93	91	97	59	58
320-42334-7 - REDL	FAI18-TW101-07		90	100	123		102	100
320-42334-8	FAI18-TW102-01		95	92	99	84	89	92
320-42334-9 - DL	FAI18-TW103-01		59	67	65	58	55	66
320-42334-9	FAI18-TW103-01		62	61	66	61	57	68
320-42334-10 - DL	FAI18-TW104-01		46 Q	51	49 Q		32 Q	43 Q
320-42334-10	FAI18-TW104-01		48 Q	41 Q	47 Q	40 Q	43 Q	51
320-42334-10 - REDL	FAI18-TW104-01		69	71	71		63	66
320-42334-10 - RE	FAI18-TW104-01		76	58	70	58	88	79
320-42334-11 - DL	FAI18-TW105-01		87	95	90	91	81	89
320-42334-11	FAI18-TW105-01		86	90	91	82	79	89
320-42334-12	FAI18-TW106-01		33 Q	35 Q	34 Q	35 Q	29 Q	34 Q
320-42334-12 - RE	FAI18-TW106-01		75	75	76	70	67	71
320-42334-13 - DL	FAI18-TW107-01		84	95	93	100	80	87
320-42334-13	FAI18-TW107-01		86	85	90	80	84	88
320-42334-14	FAI18-TW108-01		58	59	60	60	54	61
320-42334-15	FAI18-TW109-01		88	89	94	84	80	84
320-42334-16	FAI18-TW110-01		79	79	84	65	78	86
320-42334-17	FAI18-TW111-01		67	72	69	66	62	64
320-42334-18	FAI18-TW112-01		94	94	95	81	94	93
320-42334-19	FAI18-TW113-01		88	91	95	80	86	88
320-42334-20	FAI18-TW114-01		61	63	62	55	55	63
LCS 320-242249/2-A	Lab Control Sample		90	90	90	81	82	92
LCS 320-243894/2-A	Lab Control Sample	93	99	99	94	92	98	97
LCS 320-242249/3-A	Lab Control Sample Dup		92	92	91	89	94	97
LCS 320-243894/3-A	Lab Control Sample Dup	94	100	93	94	94	99	95
MB 320-242249/1-A	Method Blank		90	91	89	84	86	88
MB 320-243894/1-A	Method Blank	97	98	93	95	93	101	102

Surrogate Legend

- PFHxA = 13C2 PFHxA
- PFHxS = 18O2 PFHxS
- PFHpA = 13C4-PFHpA
- PFOA = 13C4 PFOA

TestAmerica Sacramento

Isotope Dilution Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

13C3-PFBS = 13C3-PFBS
PFOS = 13C4 PFOS
PFNA = 13C5 PFNA

1

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QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Lab Sample ID: MB 320-242249/1-A

Matrix: Water

Analysis Batch: 242966

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 242249

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		08/27/18 09:27	08/29/18 16:43	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		08/27/18 09:27	08/29/18 16:43	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		08/27/18 09:27	08/29/18 16:43	1
Perfluorooctanoic acid (PFOA)	1.5	U M	2.0	0.54	ng/L		08/27/18 09:27	08/29/18 16:43	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U M	4.0	1.1	ng/L		08/27/18 09:27	08/29/18 16:43	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		08/27/18 09:27	08/29/18 16:43	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	90		50 - 150	08/27/18 09:27	08/29/18 16:43	1
13C4-PFHpA	91		50 - 150	08/27/18 09:27	08/29/18 16:43	1
13C4 PFOA	89		50 - 150	08/27/18 09:27	08/29/18 16:43	1
13C3-PFBS	84		50 - 150	08/27/18 09:27	08/29/18 16:43	1
13C4 PFOS	86		50 - 150	08/27/18 09:27	08/29/18 16:43	1
13C5 PFNA	88		50 - 150	08/27/18 09:27	08/29/18 16:43	1

Lab Sample ID: LCS 320-242249/2-A

Matrix: Water

Analysis Batch: 242966

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 242249

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	39.4		ng/L		111	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.0		ng/L		96	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	45.1		ng/L		113	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	41.4		ng/L		103	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	40.6		ng/L		109	82 - 112
Perfluorononanoic acid (PFNA)	40.0	42.6		ng/L		106	83 - 113

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	90		50 - 150
13C4-PFHpA	90		50 - 150
13C4 PFOA	90		50 - 150
13C3-PFBS	81		50 - 150
13C4 PFOS	82		50 - 150
13C5 PFNA	92		50 - 150

Lab Sample ID: LCSD 320-242249/3-A

Matrix: Water

Analysis Batch: 243506

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 242249

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	36.2		ng/L		102	87 - 120	9	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.0		ng/L		96	81 - 106	0	30
Perfluoroheptanoic acid (PFHpA)	40.0	41.2		ng/L		103	80 - 113	9	30
Perfluorooctanoic acid (PFOA)	40.0	41.0		ng/L		102	80 - 107	1	30

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: LCSD 320-242249/3-A
Matrix: Water
Analysis Batch: 243506

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 242249

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	37.1	38.6		ng/L		104	82 - 112	5	30
Perfluorononanoic acid (PFNA)	40.0	45.1		ng/L		113	83 - 113	6	30
		LCS	LCS						
Isotope Dilution	%Recovery	Qualifier	Limits						
18O2 PFHxS	92		50 - 150						
13C4-PFHpA	92		50 - 150						
13C4 PFOA	91		50 - 150						
13C3-PFBS	89		50 - 150						
13C4 PFOS	94		50 - 150						
13C5 PFNA	97		50 - 150						

Lab Sample ID: MB 320-243894/1-A
Matrix: Water
Analysis Batch: 244122

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 243894

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		09/05/18 10:22	09/06/18 09:50	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U M	2.0	0.38	ng/L		09/05/18 10:22	09/06/18 09:50	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		09/05/18 10:22	09/06/18 09:50	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		09/05/18 10:22	09/06/18 09:50	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.1	ng/L		09/05/18 10:22	09/06/18 09:50	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		09/05/18 10:22	09/06/18 09:50	1
		MB	MB						
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
13C2 PFHxA	97		50 - 150	09/05/18 10:22	09/06/18 09:50	1			
18O2 PFHxS	98		50 - 150	09/05/18 10:22	09/06/18 09:50	1			
13C4-PFHpA	93		50 - 150	09/05/18 10:22	09/06/18 09:50	1			
13C4 PFOA	95		50 - 150	09/05/18 10:22	09/06/18 09:50	1			
13C3-PFBS	93		50 - 150	09/05/18 10:22	09/06/18 09:50	1			
13C4 PFOS	101		50 - 150	09/05/18 10:22	09/06/18 09:50	1			
13C5 PFNA	102		50 - 150	09/05/18 10:22	09/06/18 09:50	1			

Lab Sample ID: LCS 320-243894/2-A
Matrix: Water
Analysis Batch: 244122

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 243894

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	36.0		ng/L		102	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.9		ng/L		93	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	40.1		ng/L		100	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	40.9		ng/L		102	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	34.8		ng/L		94	82 - 112
Perfluorononanoic acid (PFNA)	40.0	45.0		ng/L		113	83 - 113
		LCS	LCS				
Isotope Dilution	%Recovery	Qualifier	Limits				
13C2 PFHxA	93		50 - 150				

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: LCS 320-243894/2-A
Matrix: Water
Analysis Batch: 244122

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 243894

<i>Isotope Dilution</i>	<i>LCS LCS</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
18O2 PFHxS	99		50 - 150
13C4-PFHpA	99		50 - 150
13C4 PFOA	94		50 - 150
13C3-PFBS	92		50 - 150
13C4 PFOS	98		50 - 150
13C5 PFNA	97		50 - 150

Lab Sample ID: LCSD 320-243894/3-A
Matrix: Water
Analysis Batch: 244122

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 243894

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD Result</i>	<i>LCSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.8		ng/L		93	81 - 106	0	30
Perfluoroheptanoic acid (PFHpA)	40.0	42.8		ng/L		107	80 - 113	7	30
Perfluorooctanoic acid (PFOA)	40.0	38.3		ng/L		96	80 - 107	7	30
Perfluorooctanesulfonic acid (PFOS)	37.1	33.8		ng/L		91	82 - 112	3	30
Perfluorononanoic acid (PFNA)	40.0	40.7		ng/L		102	83 - 113	10	30

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C2 PFHxA	94		50 - 150
18O2 PFHxS	100		50 - 150
13C4-PFHpA	93		50 - 150
13C4 PFOA	94		50 - 150
13C3-PFBS	94		50 - 150
13C4 PFOS	99		50 - 150
13C5 PFNA	95		50 - 150

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

LCMS

Prep Batch: 242249

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42334-1	FAI18-TW101-01	Total/NA	Water	3535	
320-42334-2 - DL	FAI18-TW101-02	Total/NA	Water	3535	
320-42334-2	FAI18-TW101-02	Total/NA	Water	3535	
320-42334-3 - DL	FAI18-TW101-03	Total/NA	Water	3535	
320-42334-3	FAI18-TW101-03	Total/NA	Water	3535	
320-42334-4 - DL	FAI18-TW101-04	Total/NA	Water	3535	
320-42334-4	FAI18-TW101-04	Total/NA	Water	3535	
320-42334-5	FAI18-TW101-05	Total/NA	Water	3535	
320-42334-6 - DL	FAI18-TW101-06	Total/NA	Water	3535	
320-42334-6	FAI18-TW101-06	Total/NA	Water	3535	
320-42334-7	FAI18-TW101-07	Total/NA	Water	3535	
320-42334-8	FAI18-TW102-01	Total/NA	Water	3535	
320-42334-9	FAI18-TW103-01	Total/NA	Water	3535	
320-42334-9 - DL	FAI18-TW103-01	Total/NA	Water	3535	
320-42334-10	FAI18-TW104-01	Total/NA	Water	3535	
320-42334-10 - DL	FAI18-TW104-01	Total/NA	Water	3535	
320-42334-11 - DL	FAI18-TW105-01	Total/NA	Water	3535	
320-42334-11	FAI18-TW105-01	Total/NA	Water	3535	
320-42334-12	FAI18-TW106-01	Total/NA	Water	3535	
320-42334-13	FAI18-TW107-01	Total/NA	Water	3535	
320-42334-13 - DL	FAI18-TW107-01	Total/NA	Water	3535	
320-42334-14	FAI18-TW108-01	Total/NA	Water	3535	
320-42334-15	FAI18-TW109-01	Total/NA	Water	3535	
320-42334-16	FAI18-TW110-01	Total/NA	Water	3535	
320-42334-17	FAI18-TW111-01	Total/NA	Water	3535	
320-42334-18	FAI18-TW112-01	Total/NA	Water	3535	
320-42334-19	FAI18-TW113-01	Total/NA	Water	3535	
320-42334-20	FAI18-TW114-01	Total/NA	Water	3535	
MB 320-242249/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-242249/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-242249/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 242704

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42334-17	FAI18-TW111-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-18	FAI18-TW112-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-19	FAI18-TW113-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-20	FAI18-TW114-01	Total/NA	Water	EPA 537 (Mod)	242249

Analysis Batch: 242966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42334-1	FAI18-TW101-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-2 - DL	FAI18-TW101-02	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-2	FAI18-TW101-02	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-3 - DL	FAI18-TW101-03	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-3	FAI18-TW101-03	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-4 - DL	FAI18-TW101-04	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-4	FAI18-TW101-04	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-5	FAI18-TW101-05	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-6 - DL	FAI18-TW101-06	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-6	FAI18-TW101-06	Total/NA	Water	EPA 537 (Mod)	242249

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

LCMS (Continued)

Analysis Batch: 242966 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42334-7	FAI18-TW101-07	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-8	FAI18-TW102-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-9 - DL	FAI18-TW103-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-9	FAI18-TW103-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-10 - DL	FAI18-TW104-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-11 - DL	FAI18-TW105-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-12	FAI18-TW106-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-13 - DL	FAI18-TW107-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-14	FAI18-TW108-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-15	FAI18-TW109-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-16	FAI18-TW110-01	Total/NA	Water	EPA 537 (Mod)	242249
MB 320-242249/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	242249
LCS 320-242249/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	242249

Analysis Batch: 243506

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42334-10	FAI18-TW104-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-11	FAI18-TW105-01	Total/NA	Water	EPA 537 (Mod)	242249
320-42334-13	FAI18-TW107-01	Total/NA	Water	EPA 537 (Mod)	242249
LCSD 320-242249/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	242249

Prep Batch: 243894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42334-3 - REDL	FAI18-TW101-03	Total/NA	Water	3535	
320-42334-3 - RE	FAI18-TW101-03	Total/NA	Water	3535	
320-42334-5 - REDL	FAI18-TW101-05	Total/NA	Water	3535	
320-42334-5 - RE	FAI18-TW101-05	Total/NA	Water	3535	
320-42334-7 - RE	FAI18-TW101-07	Total/NA	Water	3535	
320-42334-7 - REDL	FAI18-TW101-07	Total/NA	Water	3535	
320-42334-10 - RE	FAI18-TW104-01	Total/NA	Water	3535	
320-42334-10 - REDL	FAI18-TW104-01	Total/NA	Water	3535	
320-42334-12 - RE	FAI18-TW106-01	Total/NA	Water	3535	
MB 320-243894/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-243894/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-243894/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 244122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42334-3 - REDL	FAI18-TW101-03	Total/NA	Water	EPA 537 (Mod)	243894
320-42334-3 - RE	FAI18-TW101-03	Total/NA	Water	EPA 537 (Mod)	243894
320-42334-5 - REDL	FAI18-TW101-05	Total/NA	Water	EPA 537 (Mod)	243894
320-42334-5 - RE	FAI18-TW101-05	Total/NA	Water	EPA 537 (Mod)	243894
320-42334-7 - REDL	FAI18-TW101-07	Total/NA	Water	EPA 537 (Mod)	243894
320-42334-7 - RE	FAI18-TW101-07	Total/NA	Water	EPA 537 (Mod)	243894
320-42334-10 - REDL	FAI18-TW104-01	Total/NA	Water	EPA 537 (Mod)	243894
320-42334-10 - RE	FAI18-TW104-01	Total/NA	Water	EPA 537 (Mod)	243894
320-42334-12 - RE	FAI18-TW106-01	Total/NA	Water	EPA 537 (Mod)	243894
MB 320-243894/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	243894
LCS 320-243894/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	243894
LCSD 320-243894/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	243894

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-01

Date Collected: 08/17/18 11:56

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42334-1

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	3535			295.1 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 17:06	S1M	TAL SAC

Client Sample ID: FAI18-TW101-02

Date Collected: 08/17/18 13:06

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42334-2

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	3535	DL		285.5 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	10			242966	08/29/18 17:13	S1M	TAL SAC
Total/NA	Prep	3535			285.5 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 19:36	S1M	TAL SAC

Client Sample ID: FAI18-TW101-03

Date Collected: 08/17/18 13:43

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42334-3

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	3535	DL		296.4 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	10			242966	08/29/18 17:21	S1M	TAL SAC
Total/NA	Prep	3535			296.4 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 19:43	S1M	TAL SAC
Total/NA	Prep	3535	REDL		284.2 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	REDL	10			244122	09/06/18 10:12	JRB	TAL SAC
Total/NA	Prep	3535	RE		284.2 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			244122	09/06/18 10:50	JRB	TAL SAC

Client Sample ID: FAI18-TW101-04

Date Collected: 08/17/18 14:18

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42334-4

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	3535	DL		292.5 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	50			242966	08/29/18 17:28	S1M	TAL SAC
Total/NA	Prep	3535			292.5 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 19:51	S1M	TAL SAC

Client Sample ID: FAI18-TW101-05

Date Collected: 08/17/18 14:52

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42334-5

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	3535			296.5 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW101-05

Lab Sample ID: 320-42334-5

Date Collected: 08/17/18 14:52

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 537 (Mod)		100			242966	08/29/18 17:36	S1M	TAL SAC
Total/NA	Prep	3535	REDL		5 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	REDL	100			244122	09/06/18 10:20	JRB	TAL SAC
Total/NA	Prep	3535	RE		5 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			244122	09/06/18 11:20	JRB	TAL SAC

Client Sample ID: FAI18-TW101-06

Lab Sample ID: 320-42334-6

Date Collected: 08/17/18 12:31

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		296 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	10			242966	08/29/18 17:51	S1M	TAL SAC
Total/NA	Prep	3535			296 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 20:06	S1M	TAL SAC

Client Sample ID: FAI18-TW101-07

Lab Sample ID: 320-42334-7

Date Collected: 08/17/18 14:53

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			288.7 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		100			242966	08/29/18 18:06	S1M	TAL SAC
Total/NA	Prep	3535	REDL		5 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	REDL	100			244122	09/06/18 10:27	JRB	TAL SAC
Total/NA	Prep	3535	RE		5 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			244122	09/06/18 11:27	JRB	TAL SAC

Client Sample ID: FAI18-TW102-01

Lab Sample ID: 320-42334-8

Date Collected: 08/18/18 11:37

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			284.6 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 18:21	S1M	TAL SAC

Client Sample ID: FAI18-TW103-01

Lab Sample ID: 320-42334-9

Date Collected: 08/14/18 18:03

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		303.6 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	10			242966	08/29/18 18:28	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW103-01

Lab Sample ID: 320-42334-9

Date Collected: 08/14/18 18:03

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			303.6 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 20:21	S1M	TAL SAC

Client Sample ID: FAI18-TW104-01

Lab Sample ID: 320-42334-10

Date Collected: 08/18/18 10:34

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		287.4 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	20			242966	08/29/18 18:36	S1M	TAL SAC
Total/NA	Prep	3535			287.4 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243506	08/31/18 16:44	S1M	TAL SAC
Total/NA	Prep	3535	REDL		288 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	REDL	20			244122	09/06/18 10:35	JRB	TAL SAC
Total/NA	Prep	3535	RE		288 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			244122	09/06/18 11:12	JRB	TAL SAC

Client Sample ID: FAI18-TW105-01

Lab Sample ID: 320-42334-11

Date Collected: 08/18/18 14:42

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		296.1 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	10			242966	08/29/18 18:43	S1M	TAL SAC
Total/NA	Prep	3535			296.1 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243506	08/31/18 16:52	S1M	TAL SAC

Client Sample ID: FAI18-TW106-01

Lab Sample ID: 320-42334-12

Date Collected: 08/18/18 09:24

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			295.4 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 18:51	S1M	TAL SAC
Total/NA	Prep	3535	RE		285.7 mL	10.00 mL	243894	09/05/18 10:22	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			244122	09/06/18 10:42	JRB	TAL SAC

Client Sample ID: FAI18-TW107-01

Lab Sample ID: 320-42334-13

Date Collected: 08/18/18 15:52

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		291 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW107-01

Lab Sample ID: 320-42334-13

Date Collected: 08/18/18 15:52

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 537 (Mod)	DL	10			242966	08/29/18 18:58	S1M	TAL SAC
Total/NA	Prep	3535			291 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243506	08/31/18 16:59	S1M	TAL SAC

Client Sample ID: FAI18-TW108-01

Lab Sample ID: 320-42334-14

Date Collected: 08/17/18 18:00

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287.2 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 19:06	S1M	TAL SAC

Client Sample ID: FAI18-TW109-01

Lab Sample ID: 320-42334-15

Date Collected: 08/17/18 19:09

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			296.8 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 19:13	S1M	TAL SAC

Client Sample ID: FAI18-TW110-01

Lab Sample ID: 320-42334-16

Date Collected: 08/17/18 16:54

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			289.1 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242966	08/29/18 19:28	S1M	TAL SAC

Client Sample ID: FAI18-TW111-01

Lab Sample ID: 320-42334-17

Date Collected: 08/15/18 15:34

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			296.9 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242704	08/28/18 21:08	S1M	TAL SAC

Client Sample ID: FAI18-TW112-01

Lab Sample ID: 320-42334-18

Date Collected: 08/14/18 11:43

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			295.6 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242704	08/28/18 21:16	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Client Sample ID: FAI18-TW113-01

Date Collected: 08/14/18 10:05

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42334-19

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			303.1 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242704	08/28/18 21:23	S1M	TAL SAC

Client Sample ID: FAI18-TW114-01

Date Collected: 08/13/18 18:31

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42334-20

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			320.9 mL	10.00 mL	242249	08/27/18 09:27	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242704	08/28/18 21:31	S1M	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-19

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Method Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod) 3535	PFAS for QSM 5.1, Table B-15 Solid-Phase Extraction (SPE)	DOD 5.1 SW846	TAL SAC TAL SAC

Protocol References:

DOD 5.1 = Department of Defense Quality Systems Manual V5.1

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Sample Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42334-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42334-1	FAI18-TW101-01	Water	08/17/18 11:56	08/21/18 08:00
320-42334-2	FAI18-TW101-02	Water	08/17/18 13:06	08/21/18 08:00
320-42334-3	FAI18-TW101-03	Water	08/17/18 13:43	08/21/18 08:00
320-42334-4	FAI18-TW101-04	Water	08/17/18 14:18	08/21/18 08:00
320-42334-5	FAI18-TW101-05	Water	08/17/18 14:52	08/21/18 08:00
320-42334-6	FAI18-TW101-06	Water	08/17/18 12:31	08/21/18 08:00
320-42334-7	FAI18-TW101-07	Water	08/17/18 14:53	08/21/18 08:00
320-42334-8	FAI18-TW102-01	Water	08/18/18 11:37	08/21/18 08:00
320-42334-9	FAI18-TW103-01	Water	08/14/18 18:03	08/21/18 08:00
320-42334-10	FAI18-TW104-01	Water	08/18/18 10:34	08/21/18 08:00
320-42334-11	FAI18-TW105-01	Water	08/18/18 14:42	08/21/18 08:00
320-42334-12	FAI18-TW106-01	Water	08/18/18 09:24	08/21/18 08:00
320-42334-13	FAI18-TW107-01	Water	08/18/18 15:52	08/21/18 08:00
320-42334-14	FAI18-TW108-01	Water	08/17/18 18:00	08/21/18 08:00
320-42334-15	FAI18-TW109-01	Water	08/17/18 19:09	08/21/18 08:00
320-42334-16	FAI18-TW110-01	Water	08/17/18 16:54	08/21/18 08:00
320-42334-17	FAI18-TW111-01	Water	08/15/18 15:34	08/21/18 08:00
320-42334-18	FAI18-TW112-01	Water	08/14/18 11:43	08/21/18 08:00
320-42334-19	FAI18-TW113-01	Water	08/14/18 10:05	08/21/18 08:00
320-42334-20	FAI18-TW114-01	Water	08/13/18 18:31	08/21/18 08:00



R&M CONSULTANTS, INC.

CHAIN OF CUSTODY RECORD

Client:		R&M Consultants, Inc		Analytical Laboratory	TA-Sacramento	DOD Project?:	No	Cooler ID:	SILVER	Page	1	of	2
Project No. / NPD No.:	2393.03	Project Name:	FAI PFAS										
Contact Name:	Christopher Fell	Phone Number:	907.646.9655										
Reports To:	Christopher Fell	Email:	cfell@rmconsult.com										
Invoice To:	Rodney Gurritz	Email:	rodney@arcticdataservices.com										
Invoice To:	R&M Consultants, Inc		PO #:	2393.03									
Invoice To:	Attn: Accounting Department/Courtney Maillet		Quote #:	32010764									
Invoice To:	9101 Vanguard Drive, Anchorage, AK, 99507												
Invoice To:	emaillet@rmconsult.com / 907.522.1707												
RESERVED for lab use	Sample Identification	LocID	Sampler	Date (mm/dd/yy)	Time (hh:mm)	Matrix/Matrix Code	No. Containers	Sample Type (i.e. Grab(G), Comp (c), etc)	0-6°C	PFAS			
	FAI18-TW101-01	TW101	C. Fell	8/17/18	1156	WA	2	G	X				
	FAI18-TW101-02	TW101	C. Fell	8/17/18	1306	WA	2	G	X				
	FAI18-TW101-03	TW101	C. Fell	8/17/18	1343	WA	2	G	X				
	FAI18-TW101-04	TW101	C. Fell	8/17/18	1418	WA	2	G	X				
	FAI18-TW101-05	TW101	C. Fell	8/17/18	1452	WA	2	G	X				
	FAI18-TW101-06	TW101	C. Fell	8/17/18	1231	WA	2	G	X				
	FAI18-TW101-07	TW101	C. Fell	8/17/18	1453	WA	2	G	X				
	FAI18-TW102-01	TW102	C. Fell	8/18/18	1137	WA	2	G	X				
	FAI18-TW103-01	TW103	C. Fell	8/14/18	1803	WA	2	G	X				
	FAI18-TW104-01	TW104	C. Fell	8/18/18	1034	WA	2	G	X				
	FAI18-TW105-01	TW105	C. Fell	8/18/18	1442	WA	2	G	X				
	FAI18-TW106-01	TW106	C. Fell	8/18/18	0924	WA	2	G	X				
	FAI18-TW107-01	TW107	C. Fell	8/18/18	1552	WA	2	G	X				
	FAI18-TW108-01	TW108	C. Fell	8/17/18	1800	WA	2	G	X				
	FAI18-TW109-01	TW109	C. Fell	8/17/18	1909	WA	2	G	X				
	FAI18-TW110-01	TW110	C. Fell	8/17/18	1654	WA	2	G	X				
	FAI18-TW111-01	TW111	C. Fell	8/15/18	1534	WA	2	G	X				
	FAI18-TW112-01	TW112	C. Fell	8/14/18	1143	WA	2	G	X				
Relinquished By (1):	Date: 8/20		Date: 10/32	Time: 10:32	Received By: <i>[Signature]</i>	Time: 9/21/18	800						
Relinquished By (2):	Date: Christopher D. Fell		Date: 8/20	Time: 10:32	Received By: <i>[Signature]</i>	Time: 9/21/18	800						
Relinquished By (3):	Date:		Date:	Time:	Received By:	Time:							
Relinquished By (4):	Date:		Date:	Time:	Received For By Laboratory:	Time:							
Turnaround Time, Deliverable Req., and/or Special Instructions											Laboratory Check In Information		
Standard TAT, Level 2 PDF Report and Total Access											Chain of Custody Seal (Circle):		
Temp Blank °C											Contact		
4.5°C											Broken		
											Absent		



320-42334 Chain of Custody

Remarks

NEAR AFFR RELEASE POINT

USE AFFR RELEASE POINT

NEAR AFFR RELEASE POINT

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- 14
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Login Sample Receipt Checklist

Client: R&M Consultants, Inc

Job Number: 320-42334-1

Login Number: 42334

List Source: TestAmerica Sacramento

List Number: 2

Creator: Her, David A

Question	Answer	Comment
Did cooler come with a shipping slip (air bill, etc.)?	True	
If YES, enter carrier name and airbill number.	True	FedEx 782389746849
Were custody seals on outside of cooler?	True	
How many & where?	True	2 Front and Back
Seal Date/Seal Name	True	Front 8/20/18 187957, Back 8/20/18 187955
Were custody seals unbroken and intact at the date and time of arrival?	True	
Were samples screened for radioactivity using the Geiger counter?	N/A	
Were custody papers in a plastic bag & taped inside to the lid?	True	
Were custody papers filled out properly (ink, signed , etc.)?	True	
Were custody papers signed in the appropriate place?	True	
Was the project identifiable from the custody papers?	True	
If YES, enter project name.	True	FAI PFAS
Were temperature blanks used?	True	
Cooler Temperature(s)/Thermometer ID No.	True	4.5 AK-3
Initials of designated person to acknowledge receipt of cooler.	True	DH
Describe type of packing in cooler	True	BUBBLE WRAP
Were all bottles sealed in separate plastic bags?	True	
Did all bottles arrive unbroken with labels in good condition?	True	
Were all bottle labels complete (ID, date, time, signature, preservative, etc.)?	True	
Did all bottle labels agree with custody papers?	True	
Were correct containers used for the tests indicated?	True	
Were samples preserved to correct pH, if applicable?	True	
Was a sufficient amount of sample sent for tests indicated?	True	
Were bubbles absent in the volatile organic analysis (VOA) samples?	N/A	
If NO, list VOA samples.	N/A	
Was the Project Manager called and status discussed?	N/A	
Who was called? By Whom?	N/A	

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: 320-42340-1
Client Project/Site: FAI PFAS
Revision: 1

For:
R&M Consultants, Inc
9101 Vanguard Drive
Anchorage, Alaska 99507

Attn: Christopher Fell



Authorized for release by:
9/20/2018 5:28:16 PM

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

LINKS

Review your project
results through
Total Access

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: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
E	Result exceeded calibration range.
D	The reported value is from a dilution.
Q	One or more quality control criteria failed.
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

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

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Job ID: 320-42340-1

Laboratory: TestAmerica Sacramento

Narrative

Revision - September 20, 2018

Report revised to include a single page of results per sample per client request.

Receipt

The samples were received on 8/21/2018 8:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.9° C.

LCMS

Method(s) EPA 537 (Mod), EPA 537(Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) EPA 537 (Mod): The concentration of several analytes associated with the following samples exceeded the instrument calibration range: FAI18-TW130-01 (320-42340-6). These analytes have been qualified; however, the peaks did not saturate the instrument detector. The samples were diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): The concentration of several analytes associated with the following sample exceeded the instrument calibration range: FAI18-TW130-02 (320-42340-7). These analytes have been qualified; however, the peaks did not saturate the instrument detector. The sample was diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) and Perfluorohexanesulfonic acid (PFHxS) associated with the following sample exceeded the instrument calibration range: FAI18-TH102-01 (320-42340-13). These analytes have been qualified; however, the peaks did not saturate the instrument detector. This sample was diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following sample exceeded the instrument calibration range: FAI18-TH102-02 (320-42340-14). This analyte has been qualified; however, the peak did not saturate the instrument detector. This sample was diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): The concentration of several analytes associated with the following sample exceeded the instrument calibration range: FAI18-TH102-03 (320-42340-15). These analytes have been qualified; however, the peaks did not saturate the instrument detector. This sample was diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following sample exceeded the instrument calibration range at the maximum dilution of 100x: FAI18-TH102-03 (320-42340-15). This analyte has been qualified; however, the peak did not saturate the instrument detector. The client was contacted and permission was given to report the data with qualification and narration.

Method(s) EPA 537 (Mod): Several Isotope Dilution Analyte (IDA) recoveries associated with the following sample are below the method recommended limit: FAI18-TW128-01 (320-42340-4), FAI18-TW129-01 (320-42340-5) and FAI18-TW130-02 (320-42340-7). The sample was re-extracted outside of the holding time with IDA recoveries within control limits. Both sets of data are reported. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample.

Method(s) EPA 537 (Mod): The Isotope Dilution Analyte (IDA) recovery for 13C4-PFHxS and 18O2 PFHxS associated with the following samples is below the method recommended limit: FAI18-TW130-01 (320-42340-6). This sample was diluted to bring target analytes within instrument calibration range and the IDA recoveries in the analysis of the diluted extract were within method recommended limits. Both sets of data have been reported. 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 samples. All detection limits are below the lower calibration.

Method(s) EPA 537 (Mod): The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit for 13C4 PFOS: FAI18-TW130-01 (320-42340-6). This IDA was within method recommended limits in the analysis of the undiluted extract and both sets of data have been reported. 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.

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Job ID: 320-42340-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

Method(s) EPA 537 (Mod): Isotope Dilution Analyte (IDA) recoveries are below the method recommended limit for Perfluorooctanesulfonic acid (PFOS) and Perfluorononanoic acid (PFNA) in the following sample: FAI18-TH102-03 (320-42340-15). This sample was re-analyzed at dilution and showed improved IDA recoveries. Both sets of data have been reported. 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.

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

General Chemistry

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

Organic Prep

Method(s) 3535: The following sample: FAI18-TW125-01 (320-42340-1) in preparation batch 320-242780 was centrifuged prior to preparation due to an excessive amount of sediment being present, which could potentially clog the solid-phase column.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 320-242780.

Method(s) 3535: The following samples: FAI18-TW125-01 (320-42340-1), FAI18-TW126-01 (320-42340-2), FAI18-TW127-01 (320-42340-3), FAI18-TW128-01 (320-42340-4), FAI18-TW129-01 (320-42340-5), FAI18-TW130-01 (320-42340-6) and FAI18-TW130-02 (320-42340-7) in preparation batch 320-242780 were observed to contain sediment prior to extraction.

Method(s) 3535: The following samples: FAI18-TW125-01 (320-42340-1), FAI18-TW126-01 (320-42340-2), FAI18-TW128-01 (320-42340-4), FAI18-TW129-01 (320-42340-5), FAI18-TW130-01 (320-42340-6) and FAI18-TW130-02 (320-42340-7) in preparation batch 320-242780 had non-settleable particulate matter which plugged the solid-phase extraction column. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field of the prep batch. The tare weight recorded is the weight of the emptied bottle.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-244127.

Method(s) 3535: The following samples were re-prepared outside of preparation holding time due to low IDA recoveries from the first analysis: FAI18-TW128-01 (320-42340-4), FAI18-TW129-01 (320-42340-5) and FAI18-TW130-02 (320-42340-7).

Method(s) 3535: The following samples, FAI18-TW128-01 (320-42340-4), FAI18-TW129-01 (320-42340-5) and FAI18-TW130-02 (320-42340-7), had non-settleable particulate matter which plugged the solid-phase extraction column. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field of the prep batch. The tare weight recorded is the weight of the emptied bottle.

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

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW125-01

Lab Sample ID: 320-42340-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.2	J	2.4	0.55	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.7		2.4	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4	J	2.4	0.73	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.9	J	2.4	0.65	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.7	J M	4.8	1.3	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW126-01

Lab Sample ID: 320-42340-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.7		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	28		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.0		1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	6.0	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.0	J M	3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW127-01

Lab Sample ID: 320-42340-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.2	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.6	M	1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.0	J M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW128-01

Lab Sample ID: 320-42340-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.5	M	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	18		1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.9		1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	16	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	19		3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	2.6	H M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	18	H	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	8.2	H	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	16	H	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	18	H	3.5	0.95	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - RE	0.62	J H M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW129-01

Lab Sample ID: 320-42340-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	40		1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	140		1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.0	M	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	10		1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	41	H M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	140	H	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	6.1	H M	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW129-01 (Continued)

Lab Sample ID: 320-42340-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA) - RE	9.9	H	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW130-01

Lab Sample ID: 320-42340-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	360	E M	1.6	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3200	E	1.6	0.31	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	160	M	1.6	0.50	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2300	E	1.6	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	460	D M	8.2	1.9	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	4700	D E	8.2	1.6	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	100	D M	8.2	2.5	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	1500	D	8.2	2.2	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL2	3600	D	82	16	ng/L	50		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL2	120	D M	82	25	ng/L	50		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL2	1900	D	82	22	ng/L	50		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW130-02

Lab Sample ID: 320-42340-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	370	E M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3300	E	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	130	M	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1900	E M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.2	J M	3.4	0.95	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	430	D	34	7.9	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	5000	D	34	6.5	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	120	D M	34	11	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	2800	D	34	9.3	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	360	H E M	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	2600	H E	1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	110	H M	1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	1500	H E M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - REDL	450	H D M	35	8.1	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - REDL	5100	H D	35	6.7	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - REDL	130	H D M	35	11	ng/L	20		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - REDL	2800	H D M	35	9.5	ng/L	20		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-WA-RS01

Lab Sample ID: 320-42340-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.57	J	1.6	0.31	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-WA-RS02

Lab Sample ID: 320-42340-9

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	1.1	J	3.3	0.91	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-WA-RS03

Lab Sample ID: 320-42340-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.35	J M	1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TH101-01

Lab Sample ID: 320-42340-11

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.086	J M	0.36	0.074	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6		1.2	0.29	ug/Kg	1	*	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TH101-02

Lab Sample ID: 320-42340-12

No Detections.

Client Sample ID: FAI18-TH102-01

Lab Sample ID: 320-42340-13

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.6		0.42	0.061	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	37	E	0.31	0.064	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.3	M	0.31	0.081	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	5.1		0.31	0.10	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	120	E	1.0	0.25	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.25	J	0.31	0.084	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	2.2	J D	8.3	1.2	ug/Kg	20	*	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	41	D M	6.2	1.3	ug/Kg	20	*	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	5.5	J D M	6.2	2.1	ug/Kg	20	*	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	130	D	21	5.0	ug/Kg	20	*	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TH102-02

Lab Sample ID: 320-42340-14

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.29	J	0.42	0.062	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.6		0.32	0.065	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.27	J M	0.32	0.082	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.0		0.32	0.11	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	92	E	1.1	0.25	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.19	J	0.32	0.085	ug/Kg	1	*	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	7.1	D	6.3	1.3	ug/Kg	20	*	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	2.3	J D M	6.3	2.1	ug/Kg	20	*	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	100	D	21	5.0	ug/Kg	20	*	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TH102-03

Lab Sample ID: 320-42340-15

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH102-03 (Continued)

Lab Sample ID: 320-42340-15

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	26	E	0.48	0.071	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	210	E	0.36	0.075	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.9	M	0.36	0.094	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	40	E	0.36	0.12	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1700	M E	1.2	0.29	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.82		0.36	0.098	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	31	D	2.4	0.36	ug/Kg	5	☼	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	310	D E	1.8	0.37	ug/Kg	5	☼	EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	7.5	D M	1.8	0.47	ug/Kg	5	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	42	D M	1.8	0.60	ug/Kg	5	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	2300	D E	6.0	1.5	ug/Kg	5	☼	EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.85	J D	1.8	0.49	ug/Kg	5	☼	EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL2	410	D	36	7.5	ug/Kg	100	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL2	38	D M	36	12	ug/Kg	100	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL2	3000	D E	120	29	ug/Kg	100	☼	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TH103-01

Lab Sample ID: 320-42340-16

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.26	J	0.30	0.062	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.21	J M	0.30	0.10	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.8		1.0	0.24	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TH103-02

Lab Sample ID: 320-42340-17

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	4.4		0.31	0.064	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.5		0.31	0.10	ug/Kg	1	☼	EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TH104-01

Lab Sample ID: 320-42340-18

No Detections.

Client Sample ID: FAI18-TH104-02

Lab Sample ID: 320-42340-19

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW125-01

Lab Sample ID: 320-42340-1

Date Collected: 08/15/18 09:40

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.2	J	2.4	0.55	ng/L		08/29/18 08:41	08/30/18 19:24	1
Perfluorohexanesulfonic acid (PFHxS)	4.7		2.4	0.46	ng/L		08/29/18 08:41	08/30/18 19:24	1
Perfluoroheptanoic acid (PFHpA)	1.4	J	2.4	0.73	ng/L		08/29/18 08:41	08/30/18 19:24	1
Perfluorooctanoic acid (PFOA)	1.9	J	2.4	0.65	ng/L		08/29/18 08:41	08/30/18 19:24	1
Perfluorooctanesulfonic acid (PFOS)	2.7	J M	4.8	1.3	ng/L		08/29/18 08:41	08/30/18 19:24	1
Perfluorononanoic acid (PFNA)	1.8	U M	2.4	0.62	ng/L		08/29/18 08:41	08/30/18 19:24	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	60		50 - 150				08/29/18 08:41	08/30/18 19:24	1
13C4-PFHpA	63		50 - 150				08/29/18 08:41	08/30/18 19:24	1
13C4 PFOA	63		50 - 150				08/29/18 08:41	08/30/18 19:24	1
13C3-PFBS	57		50 - 150				08/29/18 08:41	08/30/18 19:24	1
13C4 PFOS	56		50 - 150				08/29/18 08:41	08/30/18 19:24	1
13C5 PFNA	65		50 - 150				08/29/18 08:41	08/30/18 19:24	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW126-01

Lab Sample ID: 320-42340-2

Date Collected: 08/15/18 11:02

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.7		1.7	0.39	ng/L		08/29/18 08:41	08/30/18 19:32	1
Perfluorohexanesulfonic acid (PFHxS)	28		1.7	0.32	ng/L		08/29/18 08:41	08/30/18 19:32	1
Perfluoroheptanoic acid (PFHpA)	3.0		1.7	0.51	ng/L		08/29/18 08:41	08/30/18 19:32	1
Perfluorooctanoic acid (PFOA)	6.0	M	1.7	0.46	ng/L		08/29/18 08:41	08/30/18 19:32	1
Perfluorooctanesulfonic acid (PFOS)	1.0	J M	3.4	0.93	ng/L		08/29/18 08:41	08/30/18 19:32	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		08/29/18 08:41	08/30/18 19:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	57		50 - 150				08/29/18 08:41	08/30/18 19:32	1
13C4-PFHpA	60		50 - 150				08/29/18 08:41	08/30/18 19:32	1
13C4 PFOA	57		50 - 150				08/29/18 08:41	08/30/18 19:32	1
13C3-PFBS	55		50 - 150				08/29/18 08:41	08/30/18 19:32	1
13C4 PFOS	53		50 - 150				08/29/18 08:41	08/30/18 19:32	1
13C5 PFNA	58		50 - 150				08/29/18 08:41	08/30/18 19:32	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW127-01

Lab Sample ID: 320-42340-3

Date Collected: 08/15/18 16:57

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.2	M	1.7	0.39	ng/L		08/29/18 08:41	08/30/18 19:39	1
Perfluorohexanesulfonic acid (PFHxS)	3.6	M	1.7	0.32	ng/L		08/29/18 08:41	08/30/18 19:39	1
Perfluoroheptanoic acid (PFHpA)	1.3	U M	1.7	0.51	ng/L		08/29/18 08:41	08/30/18 19:39	1
Perfluorooctanoic acid (PFOA)	1.0	J M	1.7	0.45	ng/L		08/29/18 08:41	08/30/18 19:39	1
Perfluorooctanesulfonic acid (PFOS)	2.5	U M	3.4	0.92	ng/L		08/29/18 08:41	08/30/18 19:39	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		08/29/18 08:41	08/30/18 19:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	91		50 - 150				08/29/18 08:41	08/30/18 19:39	1
13C4-PFHpA	90		50 - 150				08/29/18 08:41	08/30/18 19:39	1
13C4 PFOA	93		50 - 150				08/29/18 08:41	08/30/18 19:39	1
13C3-PFBS	86		50 - 150				08/29/18 08:41	08/30/18 19:39	1
13C4 PFOS	86		50 - 150				08/29/18 08:41	08/30/18 19:39	1
13C5 PFNA	90		50 - 150				08/29/18 08:41	08/30/18 19:39	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW128-01

Lab Sample ID: 320-42340-4

Date Collected: 08/16/18 09:52

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.5	M	1.8	0.41	ng/L		08/29/18 08:41	08/30/18 19:47	1
Perfluorohexanesulfonic acid (PFHxS)	18		1.8	0.34	ng/L		08/29/18 08:41	08/30/18 19:47	1
Perfluoroheptanoic acid (PFHpA)	7.9		1.8	0.54	ng/L		08/29/18 08:41	08/30/18 19:47	1
Perfluorooctanoic acid (PFOA)	16	M	1.8	0.48	ng/L		08/29/18 08:41	08/30/18 19:47	1
Perfluorooctanesulfonic acid (PFOS)	19		3.5	0.97	ng/L		08/29/18 08:41	08/30/18 19:47	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/29/18 08:41	08/30/18 19:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	40	Q	50 - 150				08/29/18 08:41	08/30/18 19:47	1
13C4-PFHpA	45	Q	50 - 150				08/29/18 08:41	08/30/18 19:47	1
13C4 PFOA	43	Q	50 - 150				08/29/18 08:41	08/30/18 19:47	1
13C3-PFBS	40	Q	50 - 150				08/29/18 08:41	08/30/18 19:47	1
13C4 PFOS	39	Q	50 - 150				08/29/18 08:41	08/30/18 19:47	1
13C5 PFNA	43	Q	50 - 150				08/29/18 08:41	08/30/18 19:47	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.6	H M	1.7	0.40	ng/L		09/06/18 10:19	09/07/18 13:24	1
Perfluorohexanesulfonic acid (PFHxS)	18	H	1.7	0.33	ng/L		09/06/18 10:19	09/07/18 13:24	1
Perfluoroheptanoic acid (PFHpA)	8.2	H	1.7	0.53	ng/L		09/06/18 10:19	09/07/18 13:24	1
Perfluorooctanoic acid (PFOA)	16	H	1.7	0.47	ng/L		09/06/18 10:19	09/07/18 13:24	1
Perfluorooctanesulfonic acid (PFOS)	18	H	3.5	0.95	ng/L		09/06/18 10:19	09/07/18 13:24	1
Perfluorononanoic acid (PFNA)	0.62	J H M	1.7	0.45	ng/L		09/06/18 10:19	09/07/18 13:24	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	77		50 - 150				09/06/18 10:19	09/07/18 13:24	1
13C4-PFHpA	77		50 - 150				09/06/18 10:19	09/07/18 13:24	1
13C4 PFOA	77		50 - 150				09/06/18 10:19	09/07/18 13:24	1
13C3-PFBS	69		50 - 150				09/06/18 10:19	09/07/18 13:24	1
13C4 PFOS	74		50 - 150				09/06/18 10:19	09/07/18 13:24	1
13C5 PFNA	76		50 - 150				09/06/18 10:19	09/07/18 13:24	1

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW129-01

Lab Sample ID: 320-42340-5

Date Collected: 08/16/18 16:50

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	40		1.7	0.39	ng/L		08/29/18 08:41	08/30/18 19:55	1
Perfluorohexanesulfonic acid (PFHxS)	140		1.7	0.33	ng/L		08/29/18 08:41	08/30/18 19:55	1
Perfluoroheptanoic acid (PFHpA)	7.0	M	1.7	0.52	ng/L		08/29/18 08:41	08/30/18 19:55	1
Perfluorooctanoic acid (PFOA)	10		1.7	0.46	ng/L		08/29/18 08:41	08/30/18 19:55	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U M	3.4	0.94	ng/L		08/29/18 08:41	08/30/18 19:55	1
Perfluorononanoic acid (PFNA)	1.3	U	1.7	0.45	ng/L		08/29/18 08:41	08/30/18 19:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	37	Q	50 - 150	08/29/18 08:41	08/30/18 19:55	1
13C4-PFHpA	38	Q	50 - 150	08/29/18 08:41	08/30/18 19:55	1
13C4 PFOA	38	Q	50 - 150	08/29/18 08:41	08/30/18 19:55	1
13C3-PFBS	34	Q	50 - 150	08/29/18 08:41	08/30/18 19:55	1
13C4 PFOS	32	Q	50 - 150	08/29/18 08:41	08/30/18 19:55	1
13C5 PFNA	39	Q	50 - 150	08/29/18 08:41	08/30/18 19:55	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	41	H M	1.7	0.40	ng/L		09/06/18 10:19	09/07/18 13:32	1
Perfluorohexanesulfonic acid (PFHxS)	140	H	1.7	0.33	ng/L		09/06/18 10:19	09/07/18 13:32	1
Perfluoroheptanoic acid (PFHpA)	6.1	H M	1.7	0.53	ng/L		09/06/18 10:19	09/07/18 13:32	1
Perfluorooctanoic acid (PFOA)	9.9	H	1.7	0.47	ng/L		09/06/18 10:19	09/07/18 13:32	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U H M	3.5	0.96	ng/L		09/06/18 10:19	09/07/18 13:32	1
Perfluorononanoic acid (PFNA)	1.3	U H	1.7	0.45	ng/L		09/06/18 10:19	09/07/18 13:32	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	80		50 - 150	09/06/18 10:19	09/07/18 13:32	1
13C4-PFHpA	80		50 - 150	09/06/18 10:19	09/07/18 13:32	1
13C4 PFOA	80		50 - 150	09/06/18 10:19	09/07/18 13:32	1
13C3-PFBS	74		50 - 150	09/06/18 10:19	09/07/18 13:32	1
13C4 PFOS	76		50 - 150	09/06/18 10:19	09/07/18 13:32	1
13C5 PFNA	76		50 - 150	09/06/18 10:19	09/07/18 13:32	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW130-01

Lab Sample ID: 320-42340-6

Date Collected: 08/18/18 13:16

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	360	E M	1.6	0.38	ng/L		08/29/18 08:41	09/01/18 01:33	1
Perfluorohexanesulfonic acid (PFHxS)	3200	E	1.6	0.31	ng/L		08/29/18 08:41	09/01/18 01:33	1
Perfluoroheptanoic acid (PFHpA)	160	M	1.6	0.50	ng/L		08/29/18 08:41	09/01/18 01:33	1
Perfluorooctanoic acid (PFOA)	2300	E	1.6	0.45	ng/L		08/29/18 08:41	09/01/18 01:33	1
Perfluorooctanesulfonic acid (PFOS)	2.5	U M	3.3	0.91	ng/L		08/29/18 08:41	09/01/18 01:33	1
Perfluorononanoic acid (PFNA)	1.2	U M	1.6	0.43	ng/L		08/29/18 08:41	09/01/18 01:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	47	Q	50 - 150				08/29/18 08:41	09/01/18 01:33	1
13C4-PFHpA	46	Q	50 - 150				08/29/18 08:41	09/01/18 01:33	1
13C4 PFOA	58		50 - 150				08/29/18 08:41	09/01/18 01:33	1
13C3-PFBS	66		50 - 150				08/29/18 08:41	09/01/18 01:33	1
13C4 PFOS	60		50 - 150				08/29/18 08:41	09/01/18 01:33	1
13C5 PFNA	67		50 - 150				08/29/18 08:41	09/01/18 01:33	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	460	D M	8.2	1.9	ng/L		08/29/18 08:41	09/12/18 15:53	5
Perfluorohexanesulfonic acid (PFHxS)	4700	D E	8.2	1.6	ng/L		08/29/18 08:41	09/12/18 15:53	5
Perfluoroheptanoic acid (PFHpA)	100	D M	8.2	2.5	ng/L		08/29/18 08:41	09/12/18 15:53	5
Perfluorooctanoic acid (PFOA)	1500	D	8.2	2.2	ng/L		08/29/18 08:41	09/12/18 15:53	5
Perfluorooctanesulfonic acid (PFOS)	12	U	16	4.5	ng/L		08/29/18 08:41	09/12/18 15:53	5
Perfluorononanoic acid (PFNA)	6.2	U M	8.2	2.1	ng/L		08/29/18 08:41	09/12/18 15:53	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	54		50 - 150				08/29/18 08:41	09/12/18 15:53	5
13C4-PFHpA	56		50 - 150				08/29/18 08:41	09/12/18 15:53	5
13C4 PFOA	57		50 - 150				08/29/18 08:41	09/12/18 15:53	5
13C3-PFBS	53		50 - 150				08/29/18 08:41	09/12/18 15:53	5
13C4 PFOS	47	Q	50 - 150				08/29/18 08:41	09/12/18 15:53	5
13C5 PFNA	52		50 - 150				08/29/18 08:41	09/12/18 15:53	5

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL2

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	3600	D	82	16	ng/L		08/29/18 08:41	09/04/18 16:44	50
Perfluoroheptanoic acid (PFHpA)	120	D M	82	25	ng/L		08/29/18 08:41	09/04/18 16:44	50
Perfluorooctanoic acid (PFOA)	1900	D	82	22	ng/L		08/29/18 08:41	09/04/18 16:44	50
Perfluorooctanesulfonic acid (PFOS)	120	U M	160	45	ng/L		08/29/18 08:41	09/04/18 16:44	50
Perfluorononanoic acid (PFNA)	62	U M	82	21	ng/L		08/29/18 08:41	09/04/18 16:44	50
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	57		50 - 150				08/29/18 08:41	09/04/18 16:44	50
13C4-PFHpA	52		50 - 150				08/29/18 08:41	09/04/18 16:44	50
13C4 PFOA	65		50 - 150				08/29/18 08:41	09/04/18 16:44	50
13C4 PFOS	55		50 - 150				08/29/18 08:41	09/04/18 16:44	50
13C5 PFNA	53		50 - 150				08/29/18 08:41	09/04/18 16:44	50

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW130-02

Lab Sample ID: 320-42340-7

Date Collected: 08/18/18 13:17

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	370	E M	1.7	0.40	ng/L		08/29/18 08:41	08/30/18 20:10	1
Perfluorohexanesulfonic acid (PFHxS)	3300	E	1.7	0.33	ng/L		08/29/18 08:41	08/30/18 20:10	1
Perfluoroheptanoic acid (PFHpA)	130	M	1.7	0.53	ng/L		08/29/18 08:41	08/30/18 20:10	1
Perfluorooctanoic acid (PFOA)	1900	E M	1.7	0.46	ng/L		08/29/18 08:41	08/30/18 20:10	1
Perfluorooctanesulfonic acid (PFOS)	1.2	J M	3.4	0.95	ng/L		08/29/18 08:41	08/30/18 20:10	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/29/18 08:41	08/30/18 20:10	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	45	Q	50 - 150				08/29/18 08:41	08/30/18 20:10	1
13C4-PFHpA	42	Q	50 - 150				08/29/18 08:41	08/30/18 20:10	1
13C4 PFOA	49	Q	50 - 150				08/29/18 08:41	08/30/18 20:10	1
13C3-PFBS	50		50 - 150				08/29/18 08:41	08/30/18 20:10	1
13C4 PFOS	46	Q	50 - 150				08/29/18 08:41	08/30/18 20:10	1
13C5 PFNA	51		50 - 150				08/29/18 08:41	08/30/18 20:10	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	430	D	34	7.9	ng/L		08/29/18 08:41	09/01/18 01:40	20
Perfluorohexanesulfonic acid (PFHxS)	5000	D	34	6.5	ng/L		08/29/18 08:41	09/01/18 01:40	20
Perfluoroheptanoic acid (PFHpA)	120	D M	34	11	ng/L		08/29/18 08:41	09/01/18 01:40	20
Perfluorooctanoic acid (PFOA)	2800	D	34	9.3	ng/L		08/29/18 08:41	09/01/18 01:40	20
Perfluorooctanesulfonic acid (PFOS)	52	U	69	19	ng/L		08/29/18 08:41	09/01/18 01:40	20
Perfluorononanoic acid (PFNA)	26	U M	34	9.0	ng/L		08/29/18 08:41	09/01/18 01:40	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	49	Q	50 - 150				08/29/18 08:41	09/01/18 01:40	20
13C4-PFHpA	52		50 - 150				08/29/18 08:41	09/01/18 01:40	20
13C4 PFOA	49	Q	50 - 150				08/29/18 08:41	09/01/18 01:40	20
13C3-PFBS	49	Q	50 - 150				08/29/18 08:41	09/01/18 01:40	20
13C4 PFOS	41	Q	50 - 150				08/29/18 08:41	09/01/18 01:40	20
13C5 PFNA	49	Q	50 - 150				08/29/18 08:41	09/01/18 01:40	20

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	360	H E M	1.8	0.41	ng/L		09/06/18 10:19	09/07/18 13:54	1
Perfluorohexanesulfonic acid (PFHxS)	2600	H E	1.8	0.34	ng/L		09/06/18 10:19	09/07/18 13:54	1
Perfluoroheptanoic acid (PFHpA)	110	H M	1.8	0.54	ng/L		09/06/18 10:19	09/07/18 13:54	1
Perfluorooctanoic acid (PFOA)	1500	H E M	1.8	0.48	ng/L		09/06/18 10:19	09/07/18 13:54	1
Perfluorooctanesulfonic acid (PFOS)	2.7	U H	3.5	0.97	ng/L		09/06/18 10:19	09/07/18 13:54	1
Perfluorononanoic acid (PFNA)	1.3	U H M	1.8	0.46	ng/L		09/06/18 10:19	09/07/18 13:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	81		50 - 150				09/06/18 10:19	09/07/18 13:54	1
13C4-PFHpA	71		50 - 150				09/06/18 10:19	09/07/18 13:54	1
13C4 PFOA	94		50 - 150				09/06/18 10:19	09/07/18 13:54	1
13C3-PFBS	93		50 - 150				09/06/18 10:19	09/07/18 13:54	1
13C4 PFOS	107		50 - 150				09/06/18 10:19	09/07/18 13:54	1

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW130-02

Lab Sample ID: 320-42340-7

Date Collected: 08/18/18 13:17

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C5 PFNA	106		50 - 150	09/06/18 10:19	09/07/18 13:54	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - REDL

<i>Analyte</i>	<i>Result</i>	<i>Qualifier</i>	<i>LOQ</i>	<i>DL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluorobutanesulfonic acid (PFBS)	450	H D M	35	8.1	ng/L		09/06/18 10:19	09/07/18 13:47	20
Perfluorohexanesulfonic acid (PFHxS)	5100	H D	35	6.7	ng/L		09/06/18 10:19	09/07/18 13:47	20
Perfluoroheptanoic acid (PFHpA)	130	H D M	35	11	ng/L		09/06/18 10:19	09/07/18 13:47	20
Perfluorooctanoic acid (PFOA)	2800	H D M	35	9.5	ng/L		09/06/18 10:19	09/07/18 13:47	20
Perfluorooctanesulfonic acid (PFOS)	53	U H	71	19	ng/L		09/06/18 10:19	09/07/18 13:47	20
Perfluorononanoic acid (PFNA)	27	U H M	35	9.2	ng/L		09/06/18 10:19	09/07/18 13:47	20

<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	91		50 - 150	09/06/18 10:19	09/07/18 13:47	20
13C4-PFHpA	91		50 - 150	09/06/18 10:19	09/07/18 13:47	20
13C4 PFOA	94		50 - 150	09/06/18 10:19	09/07/18 13:47	20
13C3-PFBS	97		50 - 150	09/06/18 10:19	09/07/18 13:47	20
13C4 PFOS	74		50 - 150	09/06/18 10:19	09/07/18 13:47	20
13C5 PFNA	94		50 - 150	09/06/18 10:19	09/07/18 13:47	20

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-WA-RS01

Lab Sample ID: 320-42340-8

Date Collected: 08/16/18 09:15

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.80	U	1.6	0.37	ng/L		08/29/18 08:41	09/01/18 01:48	1
Perfluorohexanesulfonic acid (PFHxS)	0.57	J	1.6	0.31	ng/L		08/29/18 08:41	09/01/18 01:48	1
Perfluoroheptanoic acid (PFHpA)	1.2	U M	1.6	0.49	ng/L		08/29/18 08:41	09/01/18 01:48	1
Perfluorooctanoic acid (PFOA)	1.2	U M	1.6	0.43	ng/L		08/29/18 08:41	09/01/18 01:48	1
Perfluorooctanesulfonic acid (PFOS)	2.4	U	3.2	0.88	ng/L		08/29/18 08:41	09/01/18 01:48	1
Perfluorononanoic acid (PFNA)	1.2	U M	1.6	0.42	ng/L		08/29/18 08:41	09/01/18 01:48	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	92		50 - 150				08/29/18 08:41	09/01/18 01:48	1
13C4-PFHpA	97		50 - 150				08/29/18 08:41	09/01/18 01:48	1
13C4 PFOA	99		50 - 150				08/29/18 08:41	09/01/18 01:48	1
13C3-PFBS	92		50 - 150				08/29/18 08:41	09/01/18 01:48	1
13C4 PFOS	92		50 - 150				08/29/18 08:41	09/01/18 01:48	1
13C5 PFNA	99		50 - 150				08/29/18 08:41	09/01/18 01:48	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-WA-RS02

Lab Sample ID: 320-42340-9

Date Collected: 08/17/18 15:10

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.83	U	1.7	0.38	ng/L		08/29/18 08:41	08/30/18 20:32	1
Perfluorohexanesulfonic acid (PFHxS)	0.83	U	1.7	0.32	ng/L		08/29/18 08:41	08/30/18 20:32	1
Perfluoroheptanoic acid (PFHpA)	1.2	U	1.7	0.51	ng/L		08/29/18 08:41	08/30/18 20:32	1
Perfluorooctanoic acid (PFOA)	1.2	U M	1.7	0.45	ng/L		08/29/18 08:41	08/30/18 20:32	1
Perfluorooctanesulfonic acid (PFOS)	1.1	J	3.3	0.91	ng/L		08/29/18 08:41	08/30/18 20:32	1
Perfluorononanoic acid (PFNA)	1.2	U	1.7	0.43	ng/L		08/29/18 08:41	08/30/18 20:32	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	99		50 - 150				08/29/18 08:41	08/30/18 20:32	1
13C4-PFHpA	97		50 - 150				08/29/18 08:41	08/30/18 20:32	1
13C4 PFOA	96		50 - 150				08/29/18 08:41	08/30/18 20:32	1
13C3-PFBS	95		50 - 150				08/29/18 08:41	08/30/18 20:32	1
13C4 PFOS	92		50 - 150				08/29/18 08:41	08/30/18 20:32	1
13C5 PFNA	95		50 - 150				08/29/18 08:41	08/30/18 20:32	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-WA-RS03

Lab Sample ID: 320-42340-10

Date Collected: 08/18/18 10:55

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.83	U	1.7	0.38	ng/L		08/29/18 08:41	08/30/18 20:40	1
Perfluorohexanesulfonic acid (PFHxS)	0.35	J M	1.7	0.32	ng/L		08/29/18 08:41	08/30/18 20:40	1
Perfluoroheptanoic acid (PFHpA)	1.3	U	1.7	0.51	ng/L		08/29/18 08:41	08/30/18 20:40	1
Perfluorooctanoic acid (PFOA)	1.3	U M	1.7	0.45	ng/L		08/29/18 08:41	08/30/18 20:40	1
Perfluorooctanesulfonic acid (PFOS)	2.5	U M	3.3	0.92	ng/L		08/29/18 08:41	08/30/18 20:40	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.43	ng/L		08/29/18 08:41	08/30/18 20:40	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	92		50 - 150				08/29/18 08:41	08/30/18 20:40	1
13C4-PFHpA	95		50 - 150				08/29/18 08:41	08/30/18 20:40	1
13C4 PFOA	98		50 - 150				08/29/18 08:41	08/30/18 20:40	1
13C3-PFBS	91		50 - 150				08/29/18 08:41	08/30/18 20:40	1
13C4 PFOS	93		50 - 150				08/29/18 08:41	08/30/18 20:40	1
13C5 PFNA	97		50 - 150				08/29/18 08:41	08/30/18 20:40	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH101-01

Lab Sample ID: 320-42340-11

Date Collected: 08/14/18 16:11

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 83.3

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.22	U	0.48	0.071	ug/Kg	☼	08/24/18 09:15	08/29/18 20:50	1
Perfluorohexanesulfonic acid (PFHxS)	0.086	J M	0.36	0.074	ug/Kg	☼	08/24/18 09:15	08/29/18 20:50	1
Perfluoroheptanoic acid (PFHpA)	0.24	U	0.36	0.093	ug/Kg	☼	08/24/18 09:15	08/29/18 20:50	1
Perfluorooctanoic acid (PFOA)	0.24	U M	0.36	0.12	ug/Kg	☼	08/24/18 09:15	08/29/18 20:50	1
Perfluorooctanesulfonic acid (PFOS)	1.6		1.2	0.29	ug/Kg	☼	08/24/18 09:15	08/29/18 20:50	1
Perfluorononanoic acid (PFNA)	0.24	U	0.36	0.097	ug/Kg	☼	08/24/18 09:15	08/29/18 20:50	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	72		50 - 150	08/24/18 09:15	08/29/18 20:50	1
13C4-PFHpA	81		50 - 150	08/24/18 09:15	08/29/18 20:50	1
13C4 PFOA	84		50 - 150	08/24/18 09:15	08/29/18 20:50	1
13C3-PFBS	66		50 - 150	08/24/18 09:15	08/29/18 20:50	1
13C4 PFOS	73		50 - 150	08/24/18 09:15	08/29/18 20:50	1
13C5 PFNA	83		50 - 150	08/24/18 09:15	08/29/18 20:50	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.7		0.1	0.1	%			08/23/18 16:42	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH101-02

Lab Sample ID: 320-42340-12

Date Collected: 08/14/18 16:13

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 80.3

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.22	U	0.50	0.073	ug/Kg	☼	08/24/18 09:15	08/29/18 20:58	1
Perfluorohexanesulfonic acid (PFHxS)	0.25	U	0.37	0.077	ug/Kg	☼	08/24/18 09:15	08/29/18 20:58	1
Perfluoroheptanoic acid (PFHpA)	0.25	U	0.37	0.097	ug/Kg	☼	08/24/18 09:15	08/29/18 20:58	1
Perfluorooctanoic acid (PFOA)	0.25	U M	0.37	0.12	ug/Kg	☼	08/24/18 09:15	08/29/18 20:58	1
Perfluorooctanesulfonic acid (PFOS)	0.62	U M	1.2	0.30	ug/Kg	☼	08/24/18 09:15	08/29/18 20:58	1
Perfluorononanoic acid (PFNA)	0.25	U	0.37	0.10	ug/Kg	☼	08/24/18 09:15	08/29/18 20:58	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	72		50 - 150	08/24/18 09:15	08/29/18 20:58	1
13C4-PFHpA	78		50 - 150	08/24/18 09:15	08/29/18 20:58	1
13C4 PFOA	76		50 - 150	08/24/18 09:15	08/29/18 20:58	1
13C3-PFBS	69		50 - 150	08/24/18 09:15	08/29/18 20:58	1
13C4 PFOS	75		50 - 150	08/24/18 09:15	08/29/18 20:58	1
13C5 PFNA	78		50 - 150	08/24/18 09:15	08/29/18 20:58	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.7		0.1	0.1	%			08/23/18 16:42	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH102-01

Lab Sample ID: 320-42340-13

Date Collected: 08/17/18 13:30

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 95.0

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.6		0.42	0.061	ug/Kg	☼	08/24/18 09:15	08/29/18 21:06	1
Perfluorohexanesulfonic acid (PFHxS)	37	E	0.31	0.064	ug/Kg	☼	08/24/18 09:15	08/29/18 21:06	1
Perfluoroheptanoic acid (PFHpA)	1.3	M	0.31	0.081	ug/Kg	☼	08/24/18 09:15	08/29/18 21:06	1
Perfluorooctanoic acid (PFOA)	5.1		0.31	0.10	ug/Kg	☼	08/24/18 09:15	08/29/18 21:06	1
Perfluorooctanesulfonic acid (PFOS)	120	E	1.0	0.25	ug/Kg	☼	08/24/18 09:15	08/29/18 21:06	1
Perfluorononanoic acid (PFNA)	0.25	J	0.31	0.084	ug/Kg	☼	08/24/18 09:15	08/29/18 21:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	71		50 - 150				08/24/18 09:15	08/29/18 21:06	1
13C4-PFHpA	80		50 - 150				08/24/18 09:15	08/29/18 21:06	1
13C4 PFOA	80		50 - 150				08/24/18 09:15	08/29/18 21:06	1
13C3-PFBS	77		50 - 150				08/24/18 09:15	08/29/18 21:06	1
13C4 PFOS	66		50 - 150				08/24/18 09:15	08/29/18 21:06	1
13C5 PFNA	65		50 - 150				08/24/18 09:15	08/29/18 21:06	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.2	J D	8.3	1.2	ug/Kg	☼	08/24/18 09:15	08/31/18 18:15	20
Perfluorohexanesulfonic acid (PFHxS)	41	D M	6.2	1.3	ug/Kg	☼	08/24/18 09:15	08/31/18 18:15	20
Perfluoroheptanoic acid (PFHpA)	4.2	U M	6.2	1.6	ug/Kg	☼	08/24/18 09:15	08/31/18 18:15	20
Perfluorooctanoic acid (PFOA)	5.5	J D M	6.2	2.1	ug/Kg	☼	08/24/18 09:15	08/31/18 18:15	20
Perfluorooctanesulfonic acid (PFOS)	130	D	21	5.0	ug/Kg	☼	08/24/18 09:15	08/31/18 18:15	20
Perfluorononanoic acid (PFNA)	4.2	U	6.2	1.7	ug/Kg	☼	08/24/18 09:15	08/31/18 18:15	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	74		50 - 150				08/24/18 09:15	08/31/18 18:15	20
13C4-PFHpA	82		50 - 150				08/24/18 09:15	08/31/18 18:15	20
13C4 PFOA	79		50 - 150				08/24/18 09:15	08/31/18 18:15	20
13C3-PFBS	89		50 - 150				08/24/18 09:15	08/31/18 18:15	20
13C4 PFOS	78		50 - 150				08/24/18 09:15	08/31/18 18:15	20
13C5 PFNA	85		50 - 150				08/24/18 09:15	08/31/18 18:15	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.0		0.1	0.1	%			08/23/18 16:42	1

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH102-02

Lab Sample ID: 320-42340-14

Date Collected: 08/17/18 13:31

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 94.5

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.29	J	0.42	0.062	ug/Kg	☼	08/24/18 09:15	08/29/18 21:13	1
Perfluorohexanesulfonic acid (PFHxS)	7.6		0.32	0.065	ug/Kg	☼	08/24/18 09:15	08/29/18 21:13	1
Perfluoroheptanoic acid (PFHpA)	0.27	J M	0.32	0.082	ug/Kg	☼	08/24/18 09:15	08/29/18 21:13	1
Perfluorooctanoic acid (PFOA)	2.0		0.32	0.11	ug/Kg	☼	08/24/18 09:15	08/29/18 21:13	1
Perfluorooctanesulfonic acid (PFOS)	92	E	1.1	0.25	ug/Kg	☼	08/24/18 09:15	08/29/18 21:13	1
Perfluorononanoic acid (PFNA)	0.19	J	0.32	0.085	ug/Kg	☼	08/24/18 09:15	08/29/18 21:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	80		50 - 150				08/24/18 09:15	08/29/18 21:13	1
13C4-PFHpA	84		50 - 150				08/24/18 09:15	08/29/18 21:13	1
13C4 PFOA	82		50 - 150				08/24/18 09:15	08/29/18 21:13	1
13C3-PFBS	76		50 - 150				08/24/18 09:15	08/29/18 21:13	1
13C4 PFOS	71		50 - 150				08/24/18 09:15	08/29/18 21:13	1
13C5 PFNA	70		50 - 150				08/24/18 09:15	08/29/18 21:13	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.8	U	8.4	1.2	ug/Kg	☼	08/24/18 09:15	08/31/18 18:23	20
Perfluorohexanesulfonic acid (PFHxS)	7.1	D	6.3	1.3	ug/Kg	☼	08/24/18 09:15	08/31/18 18:23	20
Perfluoroheptanoic acid (PFHpA)	4.2	U	6.3	1.6	ug/Kg	☼	08/24/18 09:15	08/31/18 18:23	20
Perfluorooctanoic acid (PFOA)	2.3	J D M	6.3	2.1	ug/Kg	☼	08/24/18 09:15	08/31/18 18:23	20
Perfluorooctanesulfonic acid (PFOS)	100	D	21	5.0	ug/Kg	☼	08/24/18 09:15	08/31/18 18:23	20
Perfluorononanoic acid (PFNA)	4.2	U	6.3	1.7	ug/Kg	☼	08/24/18 09:15	08/31/18 18:23	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	79		50 - 150				08/24/18 09:15	08/31/18 18:23	20
13C4-PFHpA	79		50 - 150				08/24/18 09:15	08/31/18 18:23	20
13C4 PFOA	77		50 - 150				08/24/18 09:15	08/31/18 18:23	20
13C3-PFBS	80		50 - 150				08/24/18 09:15	08/31/18 18:23	20
13C4 PFOS	75		50 - 150				08/24/18 09:15	08/31/18 18:23	20
13C5 PFNA	84		50 - 150				08/24/18 09:15	08/31/18 18:23	20

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.5		0.1	0.1	%			08/23/18 16:42	1

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH102-03

Lab Sample ID: 320-42340-15

Date Collected: 08/17/18 13:32

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 81.9

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	26	E	0.48	0.071	ug/Kg	☼	08/24/18 09:15	08/29/18 21:21	1
Perfluorohexanesulfonic acid (PFHxS)	210	E	0.36	0.075	ug/Kg	☼	08/24/18 09:15	08/29/18 21:21	1
Perfluoroheptanoic acid (PFHpA)	6.9	M	0.36	0.094	ug/Kg	☼	08/24/18 09:15	08/29/18 21:21	1
Perfluorooctanoic acid (PFOA)	40	E	0.36	0.12	ug/Kg	☼	08/24/18 09:15	08/29/18 21:21	1
Perfluorooctanesulfonic acid (PFOS)	1700	M E	1.2	0.29	ug/Kg	☼	08/24/18 09:15	08/29/18 21:21	1
Perfluorononanoic acid (PFNA)	0.82		0.36	0.098	ug/Kg	☼	08/24/18 09:15	08/29/18 21:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	61		50 - 150				08/24/18 09:15	08/29/18 21:21	1
13C4-PFHpA	75		50 - 150				08/24/18 09:15	08/29/18 21:21	1
13C4 PFOA	82		50 - 150				08/24/18 09:15	08/29/18 21:21	1
13C3-PFBS	99		50 - 150				08/24/18 09:15	08/29/18 21:21	1
13C4 PFOS	24	Q	50 - 150				08/24/18 09:15	08/29/18 21:21	1
13C5 PFNA	31	Q	50 - 150				08/24/18 09:15	08/29/18 21:21	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	31	D	2.4	0.36	ug/Kg	☼	08/24/18 09:15	08/31/18 18:38	5
Perfluorohexanesulfonic acid (PFHxS)	310	D E	1.8	0.37	ug/Kg	☼	08/24/18 09:15	08/31/18 18:38	5
Perfluoroheptanoic acid (PFHpA)	7.5	D M	1.8	0.47	ug/Kg	☼	08/24/18 09:15	08/31/18 18:38	5
Perfluorooctanoic acid (PFOA)	42	D M	1.8	0.60	ug/Kg	☼	08/24/18 09:15	08/31/18 18:38	5
Perfluorooctanesulfonic acid (PFOS)	2300	D E	6.0	1.5	ug/Kg	☼	08/24/18 09:15	08/31/18 18:38	5
Perfluorononanoic acid (PFNA)	0.85	J D	1.8	0.49	ug/Kg	☼	08/24/18 09:15	08/31/18 18:38	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	71		50 - 150				08/24/18 09:15	08/31/18 18:38	5
13C4-PFHpA	80		50 - 150				08/24/18 09:15	08/31/18 18:38	5
13C4 PFOA	80		50 - 150				08/24/18 09:15	08/31/18 18:38	5
13C3-PFBS	79		50 - 150				08/24/18 09:15	08/31/18 18:38	5
13C4 PFOS	40	Q	50 - 150				08/24/18 09:15	08/31/18 18:38	5
13C5 PFNA	45	Q	50 - 150				08/24/18 09:15	08/31/18 18:38	5

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL2

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	410	D	36	7.5	ug/Kg	☼	08/24/18 09:15	08/31/18 18:30	100
Perfluoroheptanoic acid (PFHpA)	24	U	36	9.4	ug/Kg	☼	08/24/18 09:15	08/31/18 18:30	100
Perfluorooctanoic acid (PFOA)	38	D M	36	12	ug/Kg	☼	08/24/18 09:15	08/31/18 18:30	100
Perfluorooctanesulfonic acid (PFOS)	3000	D E	120	29	ug/Kg	☼	08/24/18 09:15	08/31/18 18:30	100
Perfluorononanoic acid (PFNA)	24	U	36	9.8	ug/Kg	☼	08/24/18 09:15	08/31/18 18:30	100
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	68		50 - 150				08/24/18 09:15	08/31/18 18:30	100
13C4-PFHpA	80		50 - 150				08/24/18 09:15	08/31/18 18:30	100
13C4 PFOA	85		50 - 150				08/24/18 09:15	08/31/18 18:30	100
13C4 PFOS	75		50 - 150				08/24/18 09:15	08/31/18 18:30	100
13C5 PFNA	70		50 - 150				08/24/18 09:15	08/31/18 18:30	100

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

General Chemistry

Analyte

Percent Moisture

Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
18.1		0.1	0.1	%			08/23/18 16:42	1

1

2

3

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Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH103-01

Lab Sample ID: 320-42340-16

Date Collected: 08/18/18 12:44

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 97.8

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.18	U	0.40	0.059	ug/Kg	☼	08/24/18 09:15	08/31/18 18:54	1
Perfluorohexanesulfonic acid (PFHxS)	0.26	J	0.30	0.062	ug/Kg	☼	08/24/18 09:15	08/31/18 18:54	1
Perfluoroheptanoic acid (PFHpA)	0.20	U	0.30	0.079	ug/Kg	☼	08/24/18 09:15	08/31/18 18:54	1
Perfluorooctanoic acid (PFOA)	0.21	J M	0.30	0.10	ug/Kg	☼	08/24/18 09:15	08/31/18 18:54	1
Perfluorooctanesulfonic acid (PFOS)	1.8		1.0	0.24	ug/Kg	☼	08/24/18 09:15	08/31/18 18:54	1
Perfluorononanoic acid (PFNA)	0.20	U M	0.30	0.082	ug/Kg	☼	08/24/18 09:15	08/31/18 18:54	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	83		50 - 150	08/24/18 09:15	08/31/18 18:54	1
13C4-PFHpA	83		50 - 150	08/24/18 09:15	08/31/18 18:54	1
13C4 PFOA	84		50 - 150	08/24/18 09:15	08/31/18 18:54	1
13C3-PFBS	76		50 - 150	08/24/18 09:15	08/31/18 18:54	1
13C4 PFOS	78		50 - 150	08/24/18 09:15	08/31/18 18:54	1
13C5 PFNA	82		50 - 150	08/24/18 09:15	08/31/18 18:54	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	2.2		0.1	0.1	%			08/23/18 16:42	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH103-02

Lab Sample ID: 320-42340-17

Date Collected: 08/18/18 12:46

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 94.9

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.19	U	0.42	0.061	ug/Kg	☼	08/24/18 09:15	08/29/18 21:37	1
Perfluorohexanesulfonic acid (PFHxS)	4.4		0.31	0.064	ug/Kg	☼	08/24/18 09:15	08/29/18 21:37	1
Perfluoroheptanoic acid (PFHpA)	0.21	U	0.31	0.081	ug/Kg	☼	08/24/18 09:15	08/29/18 21:37	1
Perfluorooctanoic acid (PFOA)	2.5		0.31	0.10	ug/Kg	☼	08/24/18 09:15	08/29/18 21:37	1
Perfluorooctanesulfonic acid (PFOS)	0.52	U	1.0	0.25	ug/Kg	☼	08/24/18 09:15	08/29/18 21:37	1
Perfluorononanoic acid (PFNA)	0.21	U M	0.31	0.084	ug/Kg	☼	08/24/18 09:15	08/29/18 21:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	82		50 - 150				08/24/18 09:15	08/29/18 21:37	1
13C4-PFHpA	88		50 - 150				08/24/18 09:15	08/29/18 21:37	1
13C4 PFOA	84		50 - 150				08/24/18 09:15	08/29/18 21:37	1
13C3-PFBS	78		50 - 150				08/24/18 09:15	08/29/18 21:37	1
13C4 PFOS	81		50 - 150				08/24/18 09:15	08/29/18 21:37	1
13C5 PFNA	87		50 - 150				08/24/18 09:15	08/29/18 21:37	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.1		0.1	0.1	%			08/23/18 16:42	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH104-01

Lab Sample ID: 320-42340-18

Date Collected: 08/14/18 14:04

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 83.4

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.22	U	0.48	0.071	ug/Kg	☼	08/24/18 09:15	08/31/18 19:02	1
Perfluorohexanesulfonic acid (PFHxS)	0.24	U M	0.36	0.074	ug/Kg	☼	08/24/18 09:15	08/31/18 19:02	1
Perfluoroheptanoic acid (PFHpA)	0.24	U	0.36	0.093	ug/Kg	☼	08/24/18 09:15	08/31/18 19:02	1
Perfluorooctanoic acid (PFOA)	0.24	U M	0.36	0.12	ug/Kg	☼	08/24/18 09:15	08/31/18 19:02	1
Perfluorooctanesulfonic acid (PFOS)	0.60	U	1.2	0.29	ug/Kg	☼	08/24/18 09:15	08/31/18 19:02	1
Perfluorononanoic acid (PFNA)	0.24	U	0.36	0.097	ug/Kg	☼	08/24/18 09:15	08/31/18 19:02	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	71		50 - 150	08/24/18 09:15	08/31/18 19:02	1
13C4-PFHpA	80		50 - 150	08/24/18 09:15	08/31/18 19:02	1
13C4 PFOA	81		50 - 150	08/24/18 09:15	08/31/18 19:02	1
13C3-PFBS	66		50 - 150	08/24/18 09:15	08/31/18 19:02	1
13C4 PFOS	70		50 - 150	08/24/18 09:15	08/31/18 19:02	1
13C5 PFNA	83		50 - 150	08/24/18 09:15	08/31/18 19:02	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.6		0.1	0.1	%			08/23/18 16:42	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH104-02

Lab Sample ID: 320-42340-19

Date Collected: 08/14/18 14:08

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 71.7

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.25	U	0.55	0.081	ug/Kg	☼	08/24/18 09:15	08/29/18 22:16	1
Perfluorohexanesulfonic acid (PFHxS)	0.27	U M	0.41	0.085	ug/Kg	☼	08/24/18 09:15	08/29/18 22:16	1
Perfluoroheptanoic acid (PFHpA)	0.27	U	0.41	0.11	ug/Kg	☼	08/24/18 09:15	08/29/18 22:16	1
Perfluorooctanoic acid (PFOA)	0.27	U M	0.41	0.14	ug/Kg	☼	08/24/18 09:15	08/29/18 22:16	1
Perfluorooctanesulfonic acid (PFOS)	0.68	U M	1.4	0.33	ug/Kg	☼	08/24/18 09:15	08/29/18 22:16	1
Perfluorononanoic acid (PFNA)	0.27	U M	0.41	0.11	ug/Kg	☼	08/24/18 09:15	08/29/18 22:16	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	78		50 - 150	08/24/18 09:15	08/29/18 22:16	1
13C4-PFHpA	78		50 - 150	08/24/18 09:15	08/29/18 22:16	1
13C4 PFOA	81		50 - 150	08/24/18 09:15	08/29/18 22:16	1
13C3-PFBS	72		50 - 150	08/24/18 09:15	08/29/18 22:16	1
13C4 PFOS	76		50 - 150	08/24/18 09:15	08/29/18 22:16	1
13C5 PFNA	85		50 - 150	08/24/18 09:15	08/29/18 22:16	1

General Chemistry

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	28.3		0.1	0.1	%			08/23/18 16:42	1

Isotope Dilution Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PFHxS (50-150)	PFHpA (50-150)	PFOA (50-150)	3C3-PFB: (50-150)	PFOS (50-150)	PFNA (50-150)
320-42340-11	FAI18-TH101-01	72	81	84	66	73	83
320-42340-12	FAI18-TH101-02	72	78	76	69	75	78
320-42340-13	FAI18-TH102-01	71	80	80	77	66	65
320-42340-13 - DL	FAI18-TH102-01	74	82	79	89	78	85
320-42340-14	FAI18-TH102-02	80	84	82	76	71	70
320-42340-14 - DL	FAI18-TH102-02	79	79	77	80	75	84
320-42340-15	FAI18-TH102-03	61	75	82	99	24 Q	31 Q
320-42340-15 - DL2	FAI18-TH102-03	68	80	85		75	70
320-42340-15 - DL	FAI18-TH102-03	71	80	80	79	40 Q	45 Q
320-42340-16	FAI18-TH103-01	83	83	84	76	78	82
320-42340-17	FAI18-TH103-02	82	88	84	78	81	87
320-42340-18	FAI18-TH104-01	71	80	81	66	70	83
320-42340-19	FAI18-TH104-02	78	78	81	72	76	85
LCS 320-241825/2-A	Lab Control Sample	81	82	81	75	80	81
MB 320-241825/1-A	Method Blank	76	80	81	76	77	81

Surrogate Legend

PFHxS = 18O2 PFHxS
PFHpA = 13C4-PFHpA
PFOA = 13C4 PFOA
13C3-PFBS = 13C3-PFBS
PFOS = 13C4 PFOS
PFNA = 13C5 PFNA

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)						
		PFHxA (50-150)	PFHxS (50-150)	PFHpA (50-150)	PFOA (50-150)	3C3-PFB: (50-150)	PFOS (50-150)	PFNA (50-150)
320-42340-1	FAI18-TW125-01		60	63	63	57	56	65
320-42340-2	FAI18-TW126-01		57	60	57	55	53	58
320-42340-3	FAI18-TW127-01		91	90	93	86	86	90
320-42340-4	FAI18-TW128-01		40 Q	45 Q	43 Q	40 Q	39 Q	43 Q
320-42340-4 - RE	FAI18-TW128-01		77	77	77	69	74	76
320-42340-5	FAI18-TW129-01		37 Q	38 Q	38 Q	34 Q	32 Q	39 Q
320-42340-5 - RE	FAI18-TW129-01		80	80	80	74	76	76
320-42340-6	FAI18-TW130-01		47 Q	46 Q	58	66	60	67
320-42340-6 - DL2	FAI18-TW130-01		57	52	65		55	53
320-42340-6 - DL	FAI18-TW130-01		54	56	57	53	47 Q	52
320-42340-7	FAI18-TW130-02		45 Q	42 Q	49 Q	50	46 Q	51
320-42340-7 - DL	FAI18-TW130-02		49 Q	52	49 Q	49 Q	41 Q	49 Q
320-42340-7 - REDL	FAI18-TW130-02		91	91	94	97	74	94
320-42340-7 - RE	FAI18-TW130-02		81	71	94	93	107	106
320-42340-8	FAI18-WA-RS01		92	97	99	92	92	99
320-42340-9	FAI18-WA-RS02		99	97	96	95	92	95
320-42340-10	FAI18-WA-RS03		92	95	98	91	93	97
LCS 320-242780/2-A	Lab Control Sample		97	96	96	91	96	93
LCS 320-244127/2-A	Lab Control Sample	94	95	94	96	93	92	93

TestAmerica Sacramento

Isotope Dilution Summary

Client: R&M Consultants, Inc
 Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)						
		PFHxA (50-150)	PFHxS (50-150)	PFHpA (50-150)	PFOA (50-150)	3C3-PFBs (50-150)	PFOS (50-150)	PFNA (50-150)
LCSD 320-242780/3-A	Lab Control Sample Dup		93	97	95	88	90	93
LCSD 320-244127/3-A	Lab Control Sample Dup		98	95	95	87	95	97
MB 320-242780/1-A	Method Blank		94	91	91	85	91	88
MB 320-244127/1-A	Method Blank	94	94	94	97	91	95	90

Surrogate Legend

PFHxA = 13C2 PFHxA
 PFHxS = 18O2 PFHxS
 PFHpA = 13C4-PFHpA
 PFOA = 13C4 PFOA
 13C3-PFBS = 13C3-PFBS
 PFOS = 13C4 PFOS
 PFNA = 13C5 PFNA

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Lab Sample ID: MB 320-241825/1-A

Matrix: Solid

Analysis Batch: 242972

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 241825

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.18	U	0.40	0.059	ug/Kg		08/24/18 09:15	08/29/18 20:34	1
Perfluorohexanesulfonic acid (PFHxS)	0.20	U	0.30	0.062	ug/Kg		08/24/18 09:15	08/29/18 20:34	1
Perfluoroheptanoic acid (PFHpA)	0.20	U	0.30	0.078	ug/Kg		08/24/18 09:15	08/29/18 20:34	1
Perfluorooctanoic acid (PFOA)	0.20	U M	0.30	0.10	ug/Kg		08/24/18 09:15	08/29/18 20:34	1
Perfluorooctanesulfonic acid (PFOS)	0.50	U	1.0	0.24	ug/Kg		08/24/18 09:15	08/29/18 20:34	1
Perfluorononanoic acid (PFNA)	0.20	U	0.30	0.081	ug/Kg		08/24/18 09:15	08/29/18 20:34	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	76		50 - 150	08/24/18 09:15	08/29/18 20:34	1
13C4-PFHpA	80		50 - 150	08/24/18 09:15	08/29/18 20:34	1
13C4 PFOA	81		50 - 150	08/24/18 09:15	08/29/18 20:34	1
13C3-PFBS	76		50 - 150	08/24/18 09:15	08/29/18 20:34	1
13C4 PFOS	77		50 - 150	08/24/18 09:15	08/29/18 20:34	1
13C5 PFNA	81		50 - 150	08/24/18 09:15	08/29/18 20:34	1

Lab Sample ID: LCS 320-241825/2-A

Matrix: Solid

Analysis Batch: 242972

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 241825

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	1.77	1.89		ug/Kg		107	73 - 142
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.76		ug/Kg		97	75 - 121
Perfluoroheptanoic acid (PFHpA)	2.00	1.94		ug/Kg		97	76 - 124
Perfluorooctanoic acid (PFOA)	2.00	2.03		ug/Kg		101	76 - 121
Perfluorooctanesulfonic acid (PFOS)	1.86	1.86		ug/Kg		100	69 - 131
Perfluorononanoic acid (PFNA)	2.00	2.02		ug/Kg		101	74 - 126

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	81		50 - 150
13C4-PFHpA	82		50 - 150
13C4 PFOA	81		50 - 150
13C3-PFBS	75		50 - 150
13C4 PFOS	80		50 - 150
13C5 PFNA	81		50 - 150

Lab Sample ID: MB 320-242780/1-A

Matrix: Water

Analysis Batch: 243247

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 242780

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		08/29/18 08:41	08/30/18 19:02	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		08/29/18 08:41	08/30/18 19:02	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		08/29/18 08:41	08/30/18 19:02	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		08/29/18 08:41	08/30/18 19:02	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.1	ng/L		08/29/18 08:41	08/30/18 19:02	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		08/29/18 08:41	08/30/18 19:02	1

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	94		50 - 150	08/29/18 08:41	08/30/18 19:02	1
13C4-PFHpa	91		50 - 150	08/29/18 08:41	08/30/18 19:02	1
13C4 PFOA	91		50 - 150	08/29/18 08:41	08/30/18 19:02	1
13C3-PFBS	85		50 - 150	08/29/18 08:41	08/30/18 19:02	1
13C4 PFOS	91		50 - 150	08/29/18 08:41	08/30/18 19:02	1
13C5 PFNA	88		50 - 150	08/29/18 08:41	08/30/18 19:02	1

Lab Sample ID: LCS 320-242780/2-A
Matrix: Water
Analysis Batch: 243247

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 242780

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	35.3		ng/L		100	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.0		ng/L		93	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	41.6		ng/L		104	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	38.6		ng/L		96	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	34.7		ng/L		94	82 - 112
Perfluorononanoic acid (PFNA)	40.0	43.1		ng/L		108	83 - 113

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	97		50 - 150
13C4-PFHpa	96		50 - 150
13C4 PFOA	96		50 - 150
13C3-PFBS	91		50 - 150
13C4 PFOS	96		50 - 150
13C5 PFNA	93		50 - 150

Lab Sample ID: LCSD 320-242780/3-A
Matrix: Water
Analysis Batch: 243247

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 242780

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	36.2		ng/L		102	87 - 120	3	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.1		ng/L		96	81 - 106	3	30
Perfluoroheptanoic acid (PFHpA)	40.0	40.2		ng/L		101	80 - 113	3	30
Perfluorooctanoic acid (PFOA)	40.0	40.2		ng/L		100	80 - 107	4	30
Perfluorooctanesulfonic acid (PFOS)	37.1	37.0		ng/L		100	82 - 112	6	30
Perfluorononanoic acid (PFNA)	40.0	44.8		ng/L		112	83 - 113	4	30

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
18O2 PFHxS	93		50 - 150
13C4-PFHpa	97		50 - 150
13C4 PFOA	95		50 - 150
13C3-PFBS	88		50 - 150
13C4 PFOS	90		50 - 150
13C5 PFNA	93		50 - 150

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: MB 320-244127/1-A
Matrix: Water
Analysis Batch: 244458

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 244127

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		09/06/18 10:19	09/07/18 13:02	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		09/06/18 10:19	09/07/18 13:02	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		09/06/18 10:19	09/07/18 13:02	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		09/06/18 10:19	09/07/18 13:02	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.1	ng/L		09/06/18 10:19	09/07/18 13:02	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		09/06/18 10:19	09/07/18 13:02	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	94		50 - 150	09/06/18 10:19	09/07/18 13:02	1
18O2 PFHxS	94		50 - 150	09/06/18 10:19	09/07/18 13:02	1
13C4-PFHpA	94		50 - 150	09/06/18 10:19	09/07/18 13:02	1
13C4 PFOA	97		50 - 150	09/06/18 10:19	09/07/18 13:02	1
13C3-PFBS	91		50 - 150	09/06/18 10:19	09/07/18 13:02	1
13C4 PFOS	95		50 - 150	09/06/18 10:19	09/07/18 13:02	1
13C5 PFNA	90		50 - 150	09/06/18 10:19	09/07/18 13:02	1

Lab Sample ID: LCS 320-244127/2-A
Matrix: Water
Analysis Batch: 244458

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 244127

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	35.6		ng/L		101	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.6		ng/L		98	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	44.2		ng/L		110	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	41.8		ng/L		104	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	37.8		ng/L		102	82 - 112
Perfluorononanoic acid (PFNA)	40.0	43.3		ng/L		108	83 - 113

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	94		50 - 150
18O2 PFHxS	95		50 - 150
13C4-PFHpA	94		50 - 150
13C4 PFOA	96		50 - 150
13C3-PFBS	93		50 - 150
13C4 PFOS	92		50 - 150
13C5 PFNA	93		50 - 150

Lab Sample ID: LCSD 320-244127/3-A
Matrix: Water
Analysis Batch: 245076

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 244127

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	40.6		ng/L		115	87 - 120	13	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.5		ng/L		100	81 - 106	3	30
Perfluoroheptanoic acid (PFHpA)	40.0	43.4		ng/L		109	80 - 113	2	30

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: LCSD 320-244127/3-A
Matrix: Water
Analysis Batch: 245076

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 244127

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	40.0	42.4		ng/L		106	80 - 107	1	30
Perfluorooctanesulfonic acid (PFOS)	37.1	37.5		ng/L		101	82 - 112	1	30
Perfluorononanoic acid (PFNA)	40.0	45.2		ng/L		113	83 - 113	4	30
Isotope Dilution									
	%Recovery	Qualifier	Limits						
18O2 PFHxS	98		50 - 150						
13C4-PFHpA	95		50 - 150						
13C4 PFOA	95		50 - 150						
13C3-PFBS	87		50 - 150						
13C4 PFOS	95		50 - 150						
13C5 PFNA	97		50 - 150						

Method: D 2216 - Percent Moisture

Lab Sample ID: 320-42340-11 DU
Matrix: Solid
Analysis Batch: 241713

Client Sample ID: FAI18-TH101-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	16.7		18.7		%		12	20

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

LCMS

Prep Batch: 241825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-11	FAI18-TH101-01	Total/NA	Solid	SHAKE	
320-42340-12	FAI18-TH101-02	Total/NA	Solid	SHAKE	
320-42340-13	FAI18-TH102-01	Total/NA	Solid	SHAKE	
320-42340-13 - DL	FAI18-TH102-01	Total/NA	Solid	SHAKE	
320-42340-14	FAI18-TH102-02	Total/NA	Solid	SHAKE	
320-42340-14 - DL	FAI18-TH102-02	Total/NA	Solid	SHAKE	
320-42340-15	FAI18-TH102-03	Total/NA	Solid	SHAKE	
320-42340-15 - DL	FAI18-TH102-03	Total/NA	Solid	SHAKE	
320-42340-15 - DL2	FAI18-TH102-03	Total/NA	Solid	SHAKE	
320-42340-16	FAI18-TH103-01	Total/NA	Solid	SHAKE	
320-42340-17	FAI18-TH103-02	Total/NA	Solid	SHAKE	
320-42340-18	FAI18-TH104-01	Total/NA	Solid	SHAKE	
320-42340-19	FAI18-TH104-02	Total/NA	Solid	SHAKE	
MB 320-241825/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-241825/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	

Prep Batch: 242780

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-1	FAI18-TW125-01	Total/NA	Water	3535	
320-42340-2	FAI18-TW126-01	Total/NA	Water	3535	
320-42340-3	FAI18-TW127-01	Total/NA	Water	3535	
320-42340-4	FAI18-TW128-01	Total/NA	Water	3535	
320-42340-5	FAI18-TW129-01	Total/NA	Water	3535	
320-42340-6 - DL2	FAI18-TW130-01	Total/NA	Water	3535	
320-42340-6	FAI18-TW130-01	Total/NA	Water	3535	
320-42340-6 - DL	FAI18-TW130-01	Total/NA	Water	3535	
320-42340-7 - DL	FAI18-TW130-02	Total/NA	Water	3535	
320-42340-7	FAI18-TW130-02	Total/NA	Water	3535	
320-42340-8	FAI18-WA-RS01	Total/NA	Water	3535	
320-42340-9	FAI18-WA-RS02	Total/NA	Water	3535	
320-42340-10	FAI18-WA-RS03	Total/NA	Water	3535	
MB 320-242780/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-242780/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-242780/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 242972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-11	FAI18-TH101-01	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-12	FAI18-TH101-02	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-13	FAI18-TH102-01	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-14	FAI18-TH102-02	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-15	FAI18-TH102-03	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-17	FAI18-TH103-02	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-19	FAI18-TH104-02	Total/NA	Solid	EPA 537 (Mod)	241825
MB 320-241825/1-A	Method Blank	Total/NA	Solid	EPA 537 (Mod)	241825
LCS 320-241825/2-A	Lab Control Sample	Total/NA	Solid	EPA 537 (Mod)	241825

Analysis Batch: 243247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-1	FAI18-TW125-01	Total/NA	Water	EPA 537 (Mod)	242780
320-42340-2	FAI18-TW126-01	Total/NA	Water	EPA 537 (Mod)	242780

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

LCMS (Continued)

Analysis Batch: 243247 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-3	FAI18-TW127-01	Total/NA	Water	EPA 537 (Mod)	242780
320-42340-4	FAI18-TW128-01	Total/NA	Water	EPA 537 (Mod)	242780
320-42340-5	FAI18-TW129-01	Total/NA	Water	EPA 537 (Mod)	242780
320-42340-7	FAI18-TW130-02	Total/NA	Water	EPA 537 (Mod)	242780
320-42340-9	FAI18-WA-RS02	Total/NA	Water	EPA 537 (Mod)	242780
320-42340-10	FAI18-WA-RS03	Total/NA	Water	EPA 537 (Mod)	242780
MB 320-242780/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	242780
LCS 320-242780/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	242780
LCSD 320-242780/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	242780

Analysis Batch: 243471

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-13 - DL	FAI18-TH102-01	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-14 - DL	FAI18-TH102-02	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-15 - DL2	FAI18-TH102-03	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-15 - DL	FAI18-TH102-03	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-16	FAI18-TH103-01	Total/NA	Solid	EPA 537 (Mod)	241825
320-42340-18	FAI18-TH104-01	Total/NA	Solid	EPA 537 (Mod)	241825

Analysis Batch: 243483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-6	FAI18-TW130-01	Total/NA	Water	EPA 537 (Mod)	242780
320-42340-7 - DL	FAI18-TW130-02	Total/NA	Water	EPA 537 (Mod)	242780
320-42340-8	FAI18-WA-RS01	Total/NA	Water	EPA 537 (Mod)	242780

Analysis Batch: 243764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-6 - DL2	FAI18-TW130-01	Total/NA	Water	EPA 537 (Mod)	242780

Prep Batch: 244127

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-4 - RE	FAI18-TW128-01	Total/NA	Water	3535	
320-42340-5 - RE	FAI18-TW129-01	Total/NA	Water	3535	
320-42340-7 - RE	FAI18-TW130-02	Total/NA	Water	3535	
320-42340-7 - REDL	FAI18-TW130-02	Total/NA	Water	3535	
MB 320-244127/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-244127/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-244127/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 244458

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-4 - RE	FAI18-TW128-01	Total/NA	Water	EPA 537 (Mod)	244127
320-42340-5 - RE	FAI18-TW129-01	Total/NA	Water	EPA 537 (Mod)	244127
320-42340-7 - REDL	FAI18-TW130-02	Total/NA	Water	EPA 537 (Mod)	244127
320-42340-7 - RE	FAI18-TW130-02	Total/NA	Water	EPA 537 (Mod)	244127
MB 320-244127/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	244127
LCS 320-244127/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	244127

Analysis Batch: 245076

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 320-244127/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	244127

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Analysis Batch: 245345

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-6 - DL	FAI18-TW130-01	Total/NA	Water	EPA 537 (Mod)	242780

General Chemistry

Analysis Batch: 241713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42340-11	FAI18-TH101-01	Total/NA	Solid	D 2216	
320-42340-12	FAI18-TH101-02	Total/NA	Solid	D 2216	
320-42340-13	FAI18-TH102-01	Total/NA	Solid	D 2216	
320-42340-14	FAI18-TH102-02	Total/NA	Solid	D 2216	
320-42340-15	FAI18-TH102-03	Total/NA	Solid	D 2216	
320-42340-16	FAI18-TH103-01	Total/NA	Solid	D 2216	
320-42340-17	FAI18-TH103-02	Total/NA	Solid	D 2216	
320-42340-18	FAI18-TH104-01	Total/NA	Solid	D 2216	
320-42340-19	FAI18-TH104-02	Total/NA	Solid	D 2216	
320-42340-11 DU	FAI18-TH101-01	Total/NA	Solid	D 2216	

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW125-01

Date Collected: 08/15/18 09:40

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42340-1

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	3535			208.3 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243247	08/30/18 19:24	S1M	TAL SAC

Client Sample ID: FAI18-TW126-01

Date Collected: 08/15/18 11:02

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42340-2

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	3535			296.6 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243247	08/30/18 19:32	S1M	TAL SAC

Client Sample ID: FAI18-TW127-01

Date Collected: 08/15/18 16:57

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42340-3

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	3535			298.4 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243247	08/30/18 19:39	S1M	TAL SAC

Client Sample ID: FAI18-TW128-01

Date Collected: 08/16/18 09:52

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42340-4

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	3535			283.4 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243247	08/30/18 19:47	S1M	TAL SAC
Total/NA	Prep	3535	RE		289.6 mL	10.00 mL	244127	09/06/18 10:19	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			244458	09/07/18 13:24	S1M	TAL SAC

Client Sample ID: FAI18-TW129-01

Date Collected: 08/16/18 16:50

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42340-5

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	3535			291.2 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243247	08/30/18 19:55	S1M	TAL SAC
Total/NA	Prep	3535	RE		287 mL	10.00 mL	244127	09/06/18 10:19	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			244458	09/07/18 13:32	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TW130-01

Lab Sample ID: 320-42340-6

Date Collected: 08/18/18 13:16

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			303.3 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243483	09/01/18 01:33	S1M	TAL SAC
Total/NA	Prep	3535	DL2		303.3 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL2	50			243764	09/04/18 16:44	S1M	TAL SAC
Total/NA	Prep	3535	DL		303.3 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	5			245345	09/12/18 15:53	S1M	TAL SAC

Client Sample ID: FAI18-TW130-02

Lab Sample ID: 320-42340-7

Date Collected: 08/18/18 13:17

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		290.4 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	20			243483	09/01/18 01:40	S1M	TAL SAC
Total/NA	Prep	3535			290.4 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243247	08/30/18 20:10	S1M	TAL SAC
Total/NA	Prep	3535	REDL		282.8 mL	10.00 mL	244127	09/06/18 10:19	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	REDL	20			244458	09/07/18 13:47	S1M	TAL SAC
Total/NA	Prep	3535	RE		282.8 mL	10.00 mL	244127	09/06/18 10:19	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			244458	09/07/18 13:54	S1M	TAL SAC

Client Sample ID: FAI18-WA-RS01

Lab Sample ID: 320-42340-8

Date Collected: 08/16/18 09:15

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			310.8 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243483	09/01/18 01:48	S1M	TAL SAC

Client Sample ID: FAI18-WA-RS02

Lab Sample ID: 320-42340-9

Date Collected: 08/17/18 15:10

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			301.4 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243247	08/30/18 20:32	S1M	TAL SAC

Client Sample ID: FAI18-WA-RS03

Lab Sample ID: 320-42340-10

Date Collected: 08/18/18 10:55

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			300 mL	10.00 mL	242780	08/29/18 08:41	SK	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-WA-RS03

Lab Sample ID: 320-42340-10

Date Collected: 08/18/18 10:55

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 537 (Mod)		1			243247	08/30/18 20:40	S1M	TAL SAC

Client Sample ID: FAI18-TH101-01

Lab Sample ID: 320-42340-11

Date Collected: 08/14/18 16:11

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

Client Sample ID: FAI18-TH101-01

Lab Sample ID: 320-42340-11

Date Collected: 08/14/18 16:11

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 83.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.02 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242972	08/29/18 20:50	S1M	TAL SAC

Client Sample ID: FAI18-TH101-02

Lab Sample ID: 320-42340-12

Date Collected: 08/14/18 16:13

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

Client Sample ID: FAI18-TH101-02

Lab Sample ID: 320-42340-12

Date Collected: 08/14/18 16:13

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 80.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.01 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242972	08/29/18 20:58	S1M	TAL SAC

Client Sample ID: FAI18-TH102-01

Lab Sample ID: 320-42340-13

Date Collected: 08/17/18 13:30

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH102-01

Lab Sample ID: 320-42340-13

Date Collected: 08/17/18 13:30

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 95.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242972	08/29/18 21:06	S1M	TAL SAC
Total/NA	Prep	SHAKE	DL		5.07 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	20			243471	08/31/18 18:15	S1M	TAL SAC

Client Sample ID: FAI18-TH102-02

Lab Sample ID: 320-42340-14

Date Collected: 08/17/18 13:31

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

Client Sample ID: FAI18-TH102-02

Lab Sample ID: 320-42340-14

Date Collected: 08/17/18 13:31

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 94.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.03 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242972	08/29/18 21:13	S1M	TAL SAC
Total/NA	Prep	SHAKE	DL		5.03 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	20			243471	08/31/18 18:23	S1M	TAL SAC

Client Sample ID: FAI18-TH102-03

Lab Sample ID: 320-42340-15

Date Collected: 08/17/18 13:32

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

Client Sample ID: FAI18-TH102-03

Lab Sample ID: 320-42340-15

Date Collected: 08/17/18 13:32

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 81.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.05 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242972	08/29/18 21:21	S1M	TAL SAC
Total/NA	Prep	SHAKE	DL2		5.05 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL2	100			243471	08/31/18 18:30	S1M	TAL SAC
Total/NA	Prep	SHAKE	DL		5.05 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	5			243471	08/31/18 18:38	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH103-01

Lab Sample ID: 320-42340-16

Date Collected: 08/18/18 12:44

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

Client Sample ID: FAI18-TH103-01

Lab Sample ID: 320-42340-16

Date Collected: 08/18/18 12:44

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 97.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.08 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243471	08/31/18 18:54	S1M	TAL SAC

Client Sample ID: FAI18-TH103-02

Lab Sample ID: 320-42340-17

Date Collected: 08/18/18 12:46

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

Client Sample ID: FAI18-TH103-02

Lab Sample ID: 320-42340-17

Date Collected: 08/18/18 12:46

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 94.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242972	08/29/18 21:37	S1M	TAL SAC

Client Sample ID: FAI18-TH104-01

Lab Sample ID: 320-42340-18

Date Collected: 08/14/18 14:04

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

Client Sample ID: FAI18-TH104-01

Lab Sample ID: 320-42340-18

Date Collected: 08/14/18 14:04

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 83.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.00 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243471	08/31/18 19:02	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Client Sample ID: FAI18-TH104-02

Lab Sample ID: 320-42340-19

Date Collected: 08/14/18 14:08

Matrix: Solid

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			241713	08/23/18 16:42	TCS	TAL SAC

Client Sample ID: FAI18-TH104-02

Lab Sample ID: 320-42340-19

Date Collected: 08/14/18 14:08

Matrix: Solid

Date Received: 08/21/18 08:00

Percent Solids: 71.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.10 g	10.00 mL	241825	08/24/18 09:15	KJP	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242972	08/29/18 22:16	S1M	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Laboratory: TestAmerica Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-19

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
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- 15

Method Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod)	PFAS for QSM 5.1, Table B-15	DOD 5.1	TAL SAC
D 2216	Percent Moisture	ASTM	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	TAL SAC

Protocol References:

ASTM = ASTM International

DOD 5.1 = Department of Defense Quality Systems Manual V5.1

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Sample Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42340-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42340-1	FAI18-TW125-01	Water	08/15/18 09:40	08/21/18 08:00
320-42340-2	FAI18-TW126-01	Water	08/15/18 11:02	08/21/18 08:00
320-42340-3	FAI18-TW127-01	Water	08/15/18 16:57	08/21/18 08:00
320-42340-4	FAI18-TW128-01	Water	08/16/18 09:52	08/21/18 08:00
320-42340-5	FAI18-TW129-01	Water	08/16/18 16:50	08/21/18 08:00
320-42340-6	FAI18-TW130-01	Water	08/18/18 13:16	08/21/18 08:00
320-42340-7	FAI18-TW130-02	Water	08/18/18 13:17	08/21/18 08:00
320-42340-8	FAI18-WA-RS01	Water	08/16/18 09:15	08/21/18 08:00
320-42340-9	FAI18-WA-RS02	Water	08/17/18 15:10	08/21/18 08:00
320-42340-10	FAI18-WA-RS03	Water	08/18/18 10:55	08/21/18 08:00
320-42340-11	FAI18-TH101-01	Solid	08/14/18 16:11	08/21/18 08:00
320-42340-12	FAI18-TH101-02	Solid	08/14/18 16:13	08/21/18 08:00
320-42340-13	FAI18-TH102-01	Solid	08/17/18 13:30	08/21/18 08:00
320-42340-14	FAI18-TH102-02	Solid	08/17/18 13:31	08/21/18 08:00
320-42340-15	FAI18-TH102-03	Solid	08/17/18 13:32	08/21/18 08:00
320-42340-16	FAI18-TH103-01	Solid	08/18/18 12:44	08/21/18 08:00
320-42340-17	FAI18-TH103-02	Solid	08/18/18 12:46	08/21/18 08:00
320-42340-18	FAI18-TH104-01	Solid	08/14/18 14:04	08/21/18 08:00
320-42340-19	FAI18-TH104-02	Solid	08/14/18 14:08	08/21/18 08:00



R&M CONSULTANTS, INC.

CHAIN OF CUSTODY RECORD

Client:		R&M Consultants, Inc		Analytical Laboratory	TA-Sacramento	DOD Project?:	No	LEAD	Page	1	of	2
Project No. / NPDL No.:	2393.03	Project Name:	FAI PFAS									
Contact Name:	Christopher Fell	Phone Number:	907.646.9655									
Reports To:	Christopher Fell	Email:	cfell@rmconsult.com									
Invoice To:	Rodney Guritz	Email:	rodneym@arcticdataservices.com									
R&M Consultants, Inc		Attn: Accounting Department/Courtney Maillet		PO #:	2393.03	No. Containers						
9101 Vanguard Drive, Anchorage, AK, 99507		cmaillet@rmconsult.com / 907.522.1707		Quote #:	32010764							
RESERVED for lab use	Sample Identification	LocID	Sampler	Date (mm/dd/yy)	Time (hh:mm)	Matrix/ Matrix Code	Sample Type (i.e. Grab(c), Comp(c), etc.)	0-6°C	PFAS (EPA 537 modified)			
	FAI18-TW125-01	TW125	C. Fell	8/15/18	0940	WA	G	X				
	FAI18-TW126-01	TW126	C. Fell	8/15/18	1102	WA	G	X				
	FAI18-TW127-01	TW127	C. Fell	8/15/18	1657	WA	G	X				
	FAI18-TW128-01	TW128	C. Fell	8/16/18	0952	WA	G	X				
	FAI18-TW129-01	TW129	C. Fell	8/16/18	1650	WA	G	X				
	FAI18-TW130-01	TW130	C. Fell	8/18/18	1316	WA	G	X				
	FAI18-TW130-02	TW130	C. Fell	8/18/18	1317	WA	G	X				
	FAI18-WA-RS01	FAI	C. Fell	8/16/18	0915	WA	G	X				NEAR APP ROADS AREA (GWS SAMP)
	FAI18-WA-RS02	FAI	C. Fell	8/17/18	1510	WA	G	X				NEAR APP ROADS AREA (GWS SAMP)
	FAI18-WA-RS03	FAI	C. Fell	8/18/18	1055	WA	G	X				
	FAI18-TH101-01	TH101	C. Fell	8/14/18	1611	SO	G	X				
	FAI18-TH101-02	TH101	C. Fell	8/14/18	1613	SO	G	X				
	FAI18-TH102-01	TH102	C. Fell	8/17/18	1330	SO	G	X				
	FAI18-TH102-02	TH102	C. Fell	8/17/18	1331	SO	G	X				
	FAI18-TH102-03	TH102	C. Fell	8/17/18	1332	SO	G	X				
	FAI18-TH103-01	TH103	C. Fell	8/18/18	1244	SO	G	X				
	FAI18-TH103-02	TH103	C. Fell	8/18/18	1246	SO	G	X				
	FAI18-TH104-01	TH104	C. Fell	8/14/18	1404	SO	G	X				
Relinquished By (1):	Received By: <i>[Signature]</i> 8/21/18 4:10 pm											
Relinquished By (2):	Date: 8/20/18	Time: 10:15	Received By: <i>[Signature]</i>									
Relinquished By (3):	Date:	Time:	Received By:									
Relinquished By (4):	Date:	Time:	Received For By Laboratory:									
Turnaround Time, Deliverable Req., and/or Special Instructions								Standard TAT, Level 2 PDF Report and Total Access				
Laboratory Check In Information								Chain of Custody Seal (Circle):				
Temp Blank °C								Intact				
1.9c								Broken				
								Absent				





R&M CONSULTANTS, INC.

CHAIN OF CUSTODY RECORD

Client:	R&M Consultants, Inc	Analytical Laboratory	TA-Sacramento	Cooler ID:	LEAD	Page	2 of 2			
Project No. / NPDL No.:	2393.03	FAI PFAS	907.646.9655	Preservative/Analysis				Remarks		
Contact Name:	Christopher Fell	907.646.9655	cfell@rmconsult.com	0-6°C						
Reports To:	Christopher Fell	cfell@rmconsult.com	rodney@arcticdataservices.com	PFAS (EPA 537 modified)						
Invoice To:	Rodney Gurritz	rodney@arcticdataservices.com		Sample Type (ie Grab(G), Comp (c), etc)						
RESERVED for lab use	Sample Identification	LocID	Sampler	Date (mm/dd/yy)	Time (hhmm)	Matrix/ Matrix Code	No. Containers	DOD Project?	No	Turnaround Time, Deliverable Req., and/or Special Instructions
	FAI18-TH104-02	TH104	C. Fell	8/14/18	1408	SO	1	G	X	Standard TAT, Level 2 PDF Report and TotalAccess
Relinquished By (1):	Date: 8/21/18		Received By: <i>[Signature]</i>		Time: 1015		8/21/18		guc	
Relinquished By (2):	Date: 8/21/18		Received By: <i>[Signature]</i>		Time: 1015		8/21/18		guc	
Relinquished By (3):	Date: 8/21/18		Received By: <i>[Signature]</i>		Time: 1015		8/21/18		guc	
Relinquished By (4):	Date: 8/21/18		Received For By Laboratory: <i>[Signature]</i>		Time: 1015		8/21/18		guc	
Laboratory Check In Information										
Temp Blank °C										
Chain of Custody Seal (Circle):										
Intact										
Broken										
Absent										



Login Sample Receipt Checklist

Client: R&M Consultants, Inc

Job Number: 320-42340-1

Login Number: 42340

List Source: TestAmerica Sacramento

List Number: 1

Creator: Her, David A

Question	Answer	Comment
Did cooler come with a shipping slip (air bill, etc.)?	True	
If YES, enter carrier name and airbill number.	True	FEDEX 782389746827
Were custody seals on outside of cooler?	True	
How many & where?	True	2 Front & Back
Seal Date/Seal Name	True	Front 8/20/18 187952 Back 8/20/18 187951
Were custody seals unbroken and intact at the date and time of arrival?	True	
Were samples screened for radioactivity using the Geiger counter?	N/A	
Were custody papers in a plastic bag & taped inside to the lid?	True	
Were custody papers filled out properly (ink, signed , etc.)?	True	
Were custody papers signed in the appropriate place?	True	
Was the project identifiable from the custody papers?	True	
If YES, enter project name.	True	FAI PFAS
Were temperature blanks used?	True	
Cooler Temperature(s)/Thermometer ID No.	True	
Initials of designated person to acknowledge receipt of cooler.	True	
Describe type of packing in cooler	True	BUBBLE WRAP
Were all bottles sealed in separate plastic bags?	True	
Did all bottles arrive unbroken with labels in good condition?	True	
Were all bottle labels complete (ID, date, time, signature, preservative, etc.)?	True	
Did all bottle labels agree with custody papers?	True	
Were correct containers used for the tests indicated?	True	
Were samples preserved to correct pH, if applicable?	True	
Was a sufficient amount of sample sent for tests indicated?	True	
Were bubbles absent in the volatile organic analysis (VOA) samples?	N/A	
If NO, list VOA samples.	N/A	
Was the Project Manager called and status discussed?	N/A	
Who was called? By Whom?	N/A	

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: 320-42343-1
Client Project/Site: FAI PFAS
Revision: 1

For:
R&M Consultants, Inc
9101 Vanguard Drive
Anchorage, Alaska 99507

Attn: Christopher Fell



Authorized for release by:
9/20/2018 5:30:08 PM

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@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: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
Q	One or more quality control criteria failed.
H	Sample was prepped or analyzed beyond the specified holding time
E	Result exceeded calibration range.
D	The reported value is from a dilution.

Glossary

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

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Job ID: 320-42343-1

Laboratory: TestAmerica Sacramento

Narrative

Revision - September 20, 2018

Report revised to include a single page of results per sample per client request.

Receipt

The samples were received on 8/21/2018 8:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.1° C.

LCMS

Method(s) EPA 537 (Mod), EPA 537(Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following samples exceeded the instrument calibration range: FAI18-TW115-03 (320-42343-3), FAI18-TW115-04 (320-42343-4) and FAI18-TW115-05 (320-42343-5). These analytes have been qualified; however, the peaks did not saturate the instrument detector. The samples were diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): Results for sample FAI18-TW115-05 (320-42343-5) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following samples exceeded the instrument calibration range: (320-42591-A-22-A), (320-42591-A-22-B MS) and (320-42591-A-22-C MSD). This analyte has been qualified; however, the peaks did not saturate the instrument detector. The samples were diluted within calibration range and both sets of data were reported.

Method(s) EPA 537 (Mod): The matrix spike (MS) recovery for preparation batch 320-243679 and analytical batch 320-243906 was outside control limits for Perfluorooctanoic acid (PFOA) and Perfluorononanoic acid (PFNA). Matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) EPA 537 (Mod): Due to the high concentration of Perfluorooctanesulfonic acid (PFOS) and Perfluorohexanesulfonic acid (PFHxS), the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 320-243679 and analytical batch 320-243906 could not be evaluated for accuracy and precision for these analytes. The associated laboratory control sample (LCS) met acceptance criteria.

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

Organic Prep

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-242292.

Method(s) 3535: The following samples, FAI18-TW120-07 (320-42343-17), FAI18-TW122-01 (320-42343-19) and FAI18-TW124-01 (320-42343-20), had non-settleable particulate matter which plugged the solid-phase extraction column. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field of the prep batch. The tare weight recorded is the weight of the emptied bottle.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-242800.

Method(s) 3535: The following sample was biphasic: FAI18-TW121-01 (320-42343-18). It was not possible to extract the entire sample. The aqueous half of the sample was decanted into a new bottle and fortified with IDA prior to extraction. The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3535: The following samples, FAI18-TW115-03 (320-42343-3), FAI18-TW115-04 (320-42343-4), FAI18-TW116-01 (320-42343-7), FAI18-TW118-01 (320-42343-9) and FAI18-TW119-01 (320-42343-10), had non-settleable particulate matter which plugged the solid-phase extraction column. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Job ID: 320-42343-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

of the prep batch. The tare weight recorded is the weight of the emptied bottle.

Method(s) 3535: The following sample was re-prepared outside of preparation holding time due to low IDA recoveries: FAI18-TW120-07 (320-42343-17).

Method(s) 3535: The following sample, FAI18-TW120-07 (320-42343-17), had non-settleable particulate matter which plugged the solid-phase extraction column. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field of the prep batch. The tare weight recorded is the weight of the emptied bottle.

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

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Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-01

Lab Sample ID: 320-42343-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.98	J	1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.95	J M	1.8	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.6		3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW115-02

Lab Sample ID: 320-42343-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.89	J	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.2	M	1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.3	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	15	M	3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW115-03

Lab Sample ID: 320-42343-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.6	M	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	43		1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.9		1.8	0.55	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	13		1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	330	E	3.6	0.98	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	1.4	J	1.8	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	9.6	D M	3.6	0.82	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	45	D	3.6	0.68	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	5.2	D	3.6	1.1	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	12	D M	3.6	0.97	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	340	D	7.2	2.0	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - DL	1.4	J D M	3.6	0.93	ng/L	2		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW115-04

Lab Sample ID: 320-42343-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14		1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	69	M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.8		1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	17		1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	430	E	3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	1.8		1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	15	D M	3.5	0.80	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	71	D	3.5	0.66	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	8.5	D	3.5	1.1	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	16	D M	3.5	0.94	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	440	D	7.0	1.9	ng/L	2		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - DL	1.3	J D M	3.5	0.91	ng/L	2		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW115-05

Lab Sample ID: 320-42343-5

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-05 (Continued)

Lab Sample ID: 320-42343-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	26		1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	170	M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	20		1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	27		1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1300	E	3.4	0.95	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	2.5		1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	23	D	17	4.0	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	190	D	17	3.3	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	22	D M	17	5.2	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	26	D M	17	4.6	ng/L	10		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1600	D	34	9.5	ng/L	10		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW115-06

Lab Sample ID: 320-42343-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.1	J	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.5	M	1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.1	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	18		3.5	0.98	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW116-01

Lab Sample ID: 320-42343-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.7	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15	M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.9		1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	7.6	M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.9		3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW117-01

Lab Sample ID: 320-42343-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	16	M	1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8		1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	4.0	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.4		3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW118-01

Lab Sample ID: 320-42343-9

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	20	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	13	M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.5		1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.1	J M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW119-01

Lab Sample ID: 320-42343-10

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW119-01 (Continued)

Lab Sample ID: 320-42343-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	12	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	27		1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.2	J	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	7.6	M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW120-01

Lab Sample ID: 320-42343-11

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.72	J	1.9	0.43	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.3	J	1.9	0.36	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.4	M	1.9	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.7	J M	3.7	1.0	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW120-02

Lab Sample ID: 320-42343-12

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.80	J M	1.8	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.1		1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	4.8	M	1.8	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.2	J M	3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW120-03

Lab Sample ID: 320-42343-13

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.5	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	28		1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1	J M	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	22	M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.0		3.5	0.95	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW120-04

Lab Sample ID: 320-42343-14

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.7	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	17		1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.89	J M	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	16	M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.9		3.4	0.95	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW120-05

Lab Sample ID: 320-42343-15

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.4	J M	1.9	0.36	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.8	M	1.9	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.4	J M	3.8	1.0	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW120-06

Lab Sample ID: 320-42343-16

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.3	J	1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-06 (Continued)

Lab Sample ID: 320-42343-16

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.0	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.0	J M	3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW120-07

Lab Sample ID: 320-42343-17

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.4		1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	13		1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.0	J M	1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	14	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.7		3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	2.3	H M	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	12	H	1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	1.3	J H M	1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	14	H M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	5.1	H M	3.6	0.98	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW121-01

Lab Sample ID: 320-42343-18

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.2	J M	3.0	0.69	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12	M	3.0	0.57	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.7		3.0	0.91	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	7.0	M	3.0	0.81	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.8	J	6.0	1.6	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	1.3	J	3.0	0.78	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW122-01

Lab Sample ID: 320-42343-19

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	190		1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	21		1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	30		1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	70		1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	52		3.5	0.95	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	18	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW124-01

Lab Sample ID: 320-42343-20

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.7	M	1.8	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	41		1.8	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.4		1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	15	M	1.8	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	35		3.5	0.97	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	1.6	J M	1.8	0.46	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-01

Lab Sample ID: 320-42343-1

Date Collected: 08/15/18 12:02

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.88	U M	1.8	0.40	ng/L		08/29/18 10:29	08/31/18 00:35	1
Perfluorohexanesulfonic acid (PFHxS)	0.98	J	1.8	0.33	ng/L		08/29/18 10:29	08/31/18 00:35	1
Perfluoroheptanoic acid (PFHpA)	1.3	U	1.8	0.53	ng/L		08/29/18 10:29	08/31/18 00:35	1
Perfluorooctanoic acid (PFOA)	0.95	J M	1.8	0.47	ng/L		08/29/18 10:29	08/31/18 00:35	1
Perfluorooctanesulfonic acid (PFOS)	4.6		3.5	0.96	ng/L		08/29/18 10:29	08/31/18 00:35	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/29/18 10:29	08/31/18 00:35	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	90		50 - 150				08/29/18 10:29	08/31/18 00:35	1
13C4-PFHpA	91		50 - 150				08/29/18 10:29	08/31/18 00:35	1
13C4 PFOA	90		50 - 150				08/29/18 10:29	08/31/18 00:35	1
13C3-PFBS	85		50 - 150				08/29/18 10:29	08/31/18 00:35	1
13C4 PFOS	83		50 - 150				08/29/18 10:29	08/31/18 00:35	1
13C5 PFNA	93		50 - 150				08/29/18 10:29	08/31/18 00:35	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-02

Lab Sample ID: 320-42343-2

Date Collected: 08/15/18 12:40

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.89	J	1.8	0.41	ng/L		08/29/18 10:29	08/31/18 00:43	1
Perfluorohexanesulfonic acid (PFHxS)	3.2	M	1.8	0.34	ng/L		08/29/18 10:29	08/31/18 00:43	1
Perfluoroheptanoic acid (PFHpA)	1.3	U M	1.8	0.54	ng/L		08/29/18 10:29	08/31/18 00:43	1
Perfluorooctanoic acid (PFOA)	2.3	M	1.8	0.48	ng/L		08/29/18 10:29	08/31/18 00:43	1
Perfluorooctanesulfonic acid (PFOS)	15	M	3.5	0.97	ng/L		08/29/18 10:29	08/31/18 00:43	1
Perfluorononanoic acid (PFNA)	1.3	U	1.8	0.46	ng/L		08/29/18 10:29	08/31/18 00:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	89		50 - 150				08/29/18 10:29	08/31/18 00:43	1
13C4-PFHpA	92		50 - 150				08/29/18 10:29	08/31/18 00:43	1
13C4 PFOA	93		50 - 150				08/29/18 10:29	08/31/18 00:43	1
13C3-PFBS	87		50 - 150				08/29/18 10:29	08/31/18 00:43	1
13C4 PFOS	88		50 - 150				08/29/18 10:29	08/31/18 00:43	1
13C5 PFNA	93		50 - 150				08/29/18 10:29	08/31/18 00:43	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-03

Lab Sample ID: 320-42343-3

Date Collected: 08/15/18 13:28

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.6	M	1.8	0.41	ng/L		08/29/18 10:29	08/31/18 00:50	1
Perfluorohexanesulfonic acid (PFHxS)	43		1.8	0.34	ng/L		08/29/18 10:29	08/31/18 00:50	1
Perfluoroheptanoic acid (PFHpA)	4.9		1.8	0.55	ng/L		08/29/18 10:29	08/31/18 00:50	1
Perfluorooctanoic acid (PFOA)	13		1.8	0.48	ng/L		08/29/18 10:29	08/31/18 00:50	1
Perfluorooctanesulfonic acid (PFOS)	330	E	3.6	0.98	ng/L		08/29/18 10:29	08/31/18 00:50	1
Perfluorononanoic acid (PFNA)	1.4	J	1.8	0.46	ng/L		08/29/18 10:29	08/31/18 00:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	84		50 - 150				08/29/18 10:29	08/31/18 00:50	1
13C4-PFHpA	87		50 - 150				08/29/18 10:29	08/31/18 00:50	1
13C4 PFOA	92		50 - 150				08/29/18 10:29	08/31/18 00:50	1
13C3-PFBS	74		50 - 150				08/29/18 10:29	08/31/18 00:50	1
13C4 PFOS	76		50 - 150				08/29/18 10:29	08/31/18 00:50	1
13C5 PFNA	84		50 - 150				08/29/18 10:29	08/31/18 00:50	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.6	D M	3.6	0.82	ng/L		08/29/18 10:29	09/04/18 22:19	2
Perfluorohexanesulfonic acid (PFHxS)	45	D	3.6	0.68	ng/L		08/29/18 10:29	09/04/18 22:19	2
Perfluoroheptanoic acid (PFHpA)	5.2	D	3.6	1.1	ng/L		08/29/18 10:29	09/04/18 22:19	2
Perfluorooctanoic acid (PFOA)	12	D M	3.6	0.97	ng/L		08/29/18 10:29	09/04/18 22:19	2
Perfluorooctanesulfonic acid (PFOS)	340	D	7.2	2.0	ng/L		08/29/18 10:29	09/04/18 22:19	2
Perfluorononanoic acid (PFNA)	1.4	J D M	3.6	0.93	ng/L		08/29/18 10:29	09/04/18 22:19	2
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	81		50 - 150				08/29/18 10:29	09/04/18 22:19	2
13C4-PFHpA	86		50 - 150				08/29/18 10:29	09/04/18 22:19	2
13C4 PFOA	88		50 - 150				08/29/18 10:29	09/04/18 22:19	2
13C3-PFBS	80		50 - 150				08/29/18 10:29	09/04/18 22:19	2
13C4 PFOS	78		50 - 150				08/29/18 10:29	09/04/18 22:19	2
13C5 PFNA	84		50 - 150				08/29/18 10:29	09/04/18 22:19	2

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-04

Lab Sample ID: 320-42343-4

Date Collected: 08/15/18 14:01

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14		1.7	0.40	ng/L		08/29/18 10:29	08/31/18 00:58	1
Perfluorohexanesulfonic acid (PFHxS)	69	M	1.7	0.33	ng/L		08/29/18 10:29	08/31/18 00:58	1
Perfluoroheptanoic acid (PFHpA)	7.8		1.7	0.53	ng/L		08/29/18 10:29	08/31/18 00:58	1
Perfluorooctanoic acid (PFOA)	17		1.7	0.47	ng/L		08/29/18 10:29	08/31/18 00:58	1
Perfluorooctanesulfonic acid (PFOS)	430	E	3.5	0.96	ng/L		08/29/18 10:29	08/31/18 00:58	1
Perfluorononanoic acid (PFNA)	1.8		1.7	0.45	ng/L		08/29/18 10:29	08/31/18 00:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	85		50 - 150				08/29/18 10:29	08/31/18 00:58	1
13C4-PFHpA	85		50 - 150				08/29/18 10:29	08/31/18 00:58	1
13C4 PFOA	92		50 - 150				08/29/18 10:29	08/31/18 00:58	1
13C3-PFBS	80		50 - 150				08/29/18 10:29	08/31/18 00:58	1
13C4 PFOS	81		50 - 150				08/29/18 10:29	08/31/18 00:58	1
13C5 PFNA	84		50 - 150				08/29/18 10:29	08/31/18 00:58	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	15	D M	3.5	0.80	ng/L		08/29/18 10:29	09/04/18 22:27	2
Perfluorohexanesulfonic acid (PFHxS)	71	D	3.5	0.66	ng/L		08/29/18 10:29	09/04/18 22:27	2
Perfluoroheptanoic acid (PFHpA)	8.5	D	3.5	1.1	ng/L		08/29/18 10:29	09/04/18 22:27	2
Perfluorooctanoic acid (PFOA)	16	D M	3.5	0.94	ng/L		08/29/18 10:29	09/04/18 22:27	2
Perfluorooctanesulfonic acid (PFOS)	440	D	7.0	1.9	ng/L		08/29/18 10:29	09/04/18 22:27	2
Perfluorononanoic acid (PFNA)	1.3	J D M	3.5	0.91	ng/L		08/29/18 10:29	09/04/18 22:27	2
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	88		50 - 150				08/29/18 10:29	09/04/18 22:27	2
13C4-PFHpA	91		50 - 150				08/29/18 10:29	09/04/18 22:27	2
13C4 PFOA	94		50 - 150				08/29/18 10:29	09/04/18 22:27	2
13C3-PFBS	83		50 - 150				08/29/18 10:29	09/04/18 22:27	2
13C4 PFOS	86		50 - 150				08/29/18 10:29	09/04/18 22:27	2
13C5 PFNA	87		50 - 150				08/29/18 10:29	09/04/18 22:27	2

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-05

Lab Sample ID: 320-42343-5

Date Collected: 08/15/18 14:47

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	26		1.7	0.40	ng/L		08/29/18 10:29	08/31/18 01:06	1
Perfluorohexanesulfonic acid (PFHxS)	170	M	1.7	0.33	ng/L		08/29/18 10:29	08/31/18 01:06	1
Perfluoroheptanoic acid (PFHpA)	20		1.7	0.52	ng/L		08/29/18 10:29	08/31/18 01:06	1
Perfluorooctanoic acid (PFOA)	27		1.7	0.46	ng/L		08/29/18 10:29	08/31/18 01:06	1
Perfluorooctanesulfonic acid (PFOS)	1300	E	3.4	0.95	ng/L		08/29/18 10:29	08/31/18 01:06	1
Perfluorononanoic acid (PFNA)	2.5		1.7	0.45	ng/L		08/29/18 10:29	08/31/18 01:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	88		50 - 150				08/29/18 10:29	08/31/18 01:06	1
13C4-PFHpA	95		50 - 150				08/29/18 10:29	08/31/18 01:06	1
13C4 PFOA	96		50 - 150				08/29/18 10:29	08/31/18 01:06	1
13C3-PFBS	78		50 - 150				08/29/18 10:29	08/31/18 01:06	1
13C4 PFOS	76		50 - 150				08/29/18 10:29	08/31/18 01:06	1
13C5 PFNA	72		50 - 150				08/29/18 10:29	08/31/18 01:06	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	23	D	17	4.0	ng/L		08/29/18 10:29	09/04/18 22:34	10
Perfluorohexanesulfonic acid (PFHxS)	190	D	17	3.3	ng/L		08/29/18 10:29	09/04/18 22:34	10
Perfluoroheptanoic acid (PFHpA)	22	D M	17	5.2	ng/L		08/29/18 10:29	09/04/18 22:34	10
Perfluorooctanoic acid (PFOA)	26	D M	17	4.6	ng/L		08/29/18 10:29	09/04/18 22:34	10
Perfluorooctanesulfonic acid (PFOS)	1600	D	34	9.5	ng/L		08/29/18 10:29	09/04/18 22:34	10
Perfluorononanoic acid (PFNA)	13	U M	17	4.5	ng/L		08/29/18 10:29	09/04/18 22:34	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	84		50 - 150				08/29/18 10:29	09/04/18 22:34	10
13C4-PFHpA	92		50 - 150				08/29/18 10:29	09/04/18 22:34	10
13C4 PFOA	95		50 - 150				08/29/18 10:29	09/04/18 22:34	10
13C3-PFBS	94		50 - 150				08/29/18 10:29	09/04/18 22:34	10
13C4 PFOS	80		50 - 150				08/29/18 10:29	09/04/18 22:34	10
13C5 PFNA	86		50 - 150				08/29/18 10:29	09/04/18 22:34	10

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-06

Lab Sample ID: 320-42343-6

Date Collected: 08/15/18 13:01

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.1	J	1.8	0.41	ng/L		08/29/18 10:29	08/31/18 01:14	1
Perfluorohexanesulfonic acid (PFHxS)	3.5	M	1.8	0.34	ng/L		08/29/18 10:29	08/31/18 01:14	1
Perfluoroheptanoic acid (PFHpA)	1.3	U M	1.8	0.54	ng/L		08/29/18 10:29	08/31/18 01:14	1
Perfluorooctanoic acid (PFOA)	2.1	M	1.8	0.48	ng/L		08/29/18 10:29	08/31/18 01:14	1
Perfluorooctanesulfonic acid (PFOS)	18		3.5	0.98	ng/L		08/29/18 10:29	08/31/18 01:14	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/29/18 10:29	08/31/18 01:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	85		50 - 150				08/29/18 10:29	08/31/18 01:14	1
13C4-PFHpa	89		50 - 150				08/29/18 10:29	08/31/18 01:14	1
13C4 PFOA	89		50 - 150				08/29/18 10:29	08/31/18 01:14	1
13C3-PFBS	78		50 - 150				08/29/18 10:29	08/31/18 01:14	1
13C4 PFOS	82		50 - 150				08/29/18 10:29	08/31/18 01:14	1
13C5 PFNA	94		50 - 150				08/29/18 10:29	08/31/18 01:14	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW116-01

Lab Sample ID: 320-42343-7

Date Collected: 08/16/18 18:20

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.7	M	1.7	0.40	ng/L		08/29/18 10:29	08/31/18 01:22	1
Perfluorohexanesulfonic acid (PFHxS)	15	M	1.7	0.33	ng/L		08/29/18 10:29	08/31/18 01:22	1
Perfluoroheptanoic acid (PFHpA)	2.9		1.7	0.53	ng/L		08/29/18 10:29	08/31/18 01:22	1
Perfluorooctanoic acid (PFOA)	7.6	M	1.7	0.47	ng/L		08/29/18 10:29	08/31/18 01:22	1
Perfluorooctanesulfonic acid (PFOS)	9.9		3.5	0.96	ng/L		08/29/18 10:29	08/31/18 01:22	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/29/18 10:29	08/31/18 01:22	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	81		50 - 150				08/29/18 10:29	08/31/18 01:22	1
13C4-PFHpA	79		50 - 150				08/29/18 10:29	08/31/18 01:22	1
13C4 PFOA	89		50 - 150				08/29/18 10:29	08/31/18 01:22	1
13C3-PFBS	74		50 - 150				08/29/18 10:29	08/31/18 01:22	1
13C4 PFOS	80		50 - 150				08/29/18 10:29	08/31/18 01:22	1
13C5 PFNA	90		50 - 150				08/29/18 10:29	08/31/18 01:22	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW117-01

Lab Sample ID: 320-42343-8

Date Collected: 08/15/18 18:15

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14	M	1.7	0.39	ng/L		08/29/18 10:29	08/31/18 01:37	1
Perfluorohexanesulfonic acid (PFHxS)	16	M	1.7	0.32	ng/L		08/29/18 10:29	08/31/18 01:37	1
Perfluoroheptanoic acid (PFHpA)	1.8		1.7	0.52	ng/L		08/29/18 10:29	08/31/18 01:37	1
Perfluorooctanoic acid (PFOA)	4.0	M	1.7	0.46	ng/L		08/29/18 10:29	08/31/18 01:37	1
Perfluorooctanesulfonic acid (PFOS)	4.4		3.4	0.93	ng/L		08/29/18 10:29	08/31/18 01:37	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		08/29/18 10:29	08/31/18 01:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	95		50 - 150				08/29/18 10:29	08/31/18 01:37	1
13C4-PFHpA	98		50 - 150				08/29/18 10:29	08/31/18 01:37	1
13C4 PFOA	92		50 - 150				08/29/18 10:29	08/31/18 01:37	1
13C3-PFBS	86		50 - 150				08/29/18 10:29	08/31/18 01:37	1
13C4 PFOS	89		50 - 150				08/29/18 10:29	08/31/18 01:37	1
13C5 PFNA	92		50 - 150				08/29/18 10:29	08/31/18 01:37	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW118-01

Lab Sample ID: 320-42343-9

Date Collected: 08/17/18 09:28

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	20	M	1.7	0.40	ng/L		08/29/18 10:29	08/31/18 01:45	1
Perfluorohexanesulfonic acid (PFHxS)	13	M	1.7	0.33	ng/L		08/29/18 10:29	08/31/18 01:45	1
Perfluoroheptanoic acid (PFHpA)	2.5		1.7	0.53	ng/L		08/29/18 10:29	08/31/18 01:45	1
Perfluorooctanoic acid (PFOA)	1.1	J M	1.7	0.47	ng/L		08/29/18 10:29	08/31/18 01:45	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U M	3.4	0.95	ng/L		08/29/18 10:29	08/31/18 01:45	1
Perfluorononanoic acid (PFNA)	1.3	U	1.7	0.45	ng/L		08/29/18 10:29	08/31/18 01:45	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	82		50 - 150	08/29/18 10:29	08/31/18 01:45	1
13C4-PFHpA	78		50 - 150	08/29/18 10:29	08/31/18 01:45	1
13C4 PFOA	89		50 - 150	08/29/18 10:29	08/31/18 01:45	1
13C3-PFBS	67		50 - 150	08/29/18 10:29	08/31/18 01:45	1
13C4 PFOS	79		50 - 150	08/29/18 10:29	08/31/18 01:45	1
13C5 PFNA	91		50 - 150	08/29/18 10:29	08/31/18 01:45	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW119-01

Lab Sample ID: 320-42343-10

Date Collected: 08/16/18 08:35

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	12	M	1.7	0.40	ng/L		08/29/18 10:29	08/31/18 01:53	1
Perfluorohexanesulfonic acid (PFHxS)	27		1.7	0.33	ng/L		08/29/18 10:29	08/31/18 01:53	1
Perfluoroheptanoic acid (PFHpA)	1.2	J	1.7	0.53	ng/L		08/29/18 10:29	08/31/18 01:53	1
Perfluorooctanoic acid (PFOA)	7.6	M	1.7	0.47	ng/L		08/29/18 10:29	08/31/18 01:53	1
Perfluorooctanesulfonic acid (PFOS)	2.6	U	3.5	0.96	ng/L		08/29/18 10:29	08/31/18 01:53	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/29/18 10:29	08/31/18 01:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	80		50 - 150				08/29/18 10:29	08/31/18 01:53	1
13C4-PFHpA	83		50 - 150				08/29/18 10:29	08/31/18 01:53	1
13C4 PFOA	84		50 - 150				08/29/18 10:29	08/31/18 01:53	1
13C3-PFBS	77		50 - 150				08/29/18 10:29	08/31/18 01:53	1
13C4 PFOS	73		50 - 150				08/29/18 10:29	08/31/18 01:53	1
13C5 PFNA	78		50 - 150				08/29/18 10:29	08/31/18 01:53	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-01

Lab Sample ID: 320-42343-11

Date Collected: 08/13/18 13:01

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.72	J	1.9	0.43	ng/L		08/27/18 11:31	08/28/18 16:45	1
Perfluorohexanesulfonic acid (PFHxS)	1.3	J	1.9	0.36	ng/L		08/27/18 11:31	08/28/18 16:45	1
Perfluoroheptanoic acid (PFHpA)	1.4	U	1.9	0.57	ng/L		08/27/18 11:31	08/28/18 16:45	1
Perfluorooctanoic acid (PFOA)	2.4	M	1.9	0.51	ng/L		08/27/18 11:31	08/28/18 16:45	1
Perfluorooctanesulfonic acid (PFOS)	1.7	J M	3.7	1.0	ng/L		08/27/18 11:31	08/28/18 16:45	1
Perfluorononanoic acid (PFNA)	1.4	U M	1.9	0.49	ng/L		08/27/18 11:31	08/28/18 16:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	91		50 - 150				08/27/18 11:31	08/28/18 16:45	1
13C4-PFHpa	93		50 - 150				08/27/18 11:31	08/28/18 16:45	1
13C4 PFOA	90		50 - 150				08/27/18 11:31	08/28/18 16:45	1
13C3-PFBS	87		50 - 150				08/27/18 11:31	08/28/18 16:45	1
13C4 PFOS	85		50 - 150				08/27/18 11:31	08/28/18 16:45	1
13C5 PFNA	91		50 - 150				08/27/18 11:31	08/28/18 16:45	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-02

Lab Sample ID: 320-42343-12

Date Collected: 08/13/18 13:56

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.80	J M	1.8	0.40	ng/L		08/27/18 11:31	08/28/18 16:52	1
Perfluorohexanesulfonic acid (PFHxS)	5.1		1.8	0.33	ng/L		08/27/18 11:31	08/28/18 16:52	1
Perfluoroheptanoic acid (PFHpA)	1.3	U M	1.8	0.53	ng/L		08/27/18 11:31	08/28/18 16:52	1
Perfluorooctanoic acid (PFOA)	4.8	M	1.8	0.47	ng/L		08/27/18 11:31	08/28/18 16:52	1
Perfluorooctanesulfonic acid (PFOS)	2.2	J M	3.5	0.96	ng/L		08/27/18 11:31	08/28/18 16:52	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/27/18 11:31	08/28/18 16:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	90		50 - 150				08/27/18 11:31	08/28/18 16:52	1
13C4-PFHpA	93		50 - 150				08/27/18 11:31	08/28/18 16:52	1
13C4 PFOA	91		50 - 150				08/27/18 11:31	08/28/18 16:52	1
13C3-PFBS	89		50 - 150				08/27/18 11:31	08/28/18 16:52	1
13C4 PFOS	88		50 - 150				08/27/18 11:31	08/28/18 16:52	1
13C5 PFNA	93		50 - 150				08/27/18 11:31	08/28/18 16:52	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-03

Lab Sample ID: 320-42343-13

Date Collected: 08/13/18 14:19

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.5	M	1.7	0.40	ng/L		08/27/18 11:31	08/28/18 17:00	1
Perfluorohexanesulfonic acid (PFHxS)	28		1.7	0.33	ng/L		08/27/18 11:31	08/28/18 17:00	1
Perfluoroheptanoic acid (PFHpA)	1.1	J M	1.7	0.53	ng/L		08/27/18 11:31	08/28/18 17:00	1
Perfluorooctanoic acid (PFOA)	22	M	1.7	0.47	ng/L		08/27/18 11:31	08/28/18 17:00	1
Perfluorooctanesulfonic acid (PFOS)	8.0		3.5	0.95	ng/L		08/27/18 11:31	08/28/18 17:00	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/27/18 11:31	08/28/18 17:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	92		50 - 150				08/27/18 11:31	08/28/18 17:00	1
13C4-PFHpA	90		50 - 150				08/27/18 11:31	08/28/18 17:00	1
13C4 PFOA	92		50 - 150				08/27/18 11:31	08/28/18 17:00	1
13C3-PFBS	85		50 - 150				08/27/18 11:31	08/28/18 17:00	1
13C4 PFOS	86		50 - 150				08/27/18 11:31	08/28/18 17:00	1
13C5 PFNA	90		50 - 150				08/27/18 11:31	08/28/18 17:00	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-04

Lab Sample ID: 320-42343-14

Date Collected: 08/13/18 14:42

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.7	M	1.7	0.40	ng/L		08/27/18 11:31	08/28/18 17:07	1
Perfluorohexanesulfonic acid (PFHxS)	17		1.7	0.33	ng/L		08/27/18 11:31	08/28/18 17:07	1
Perfluoroheptanoic acid (PFHpA)	0.89	J M	1.7	0.53	ng/L		08/27/18 11:31	08/28/18 17:07	1
Perfluorooctanoic acid (PFOA)	16	M	1.7	0.47	ng/L		08/27/18 11:31	08/28/18 17:07	1
Perfluorooctanesulfonic acid (PFOS)	5.9		3.4	0.95	ng/L		08/27/18 11:31	08/28/18 17:07	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		08/27/18 11:31	08/28/18 17:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	95		50 - 150				08/27/18 11:31	08/28/18 17:07	1
13C4-PFHpA	90		50 - 150				08/27/18 11:31	08/28/18 17:07	1
13C4 PFOA	89		50 - 150				08/27/18 11:31	08/28/18 17:07	1
13C3-PFBS	89		50 - 150				08/27/18 11:31	08/28/18 17:07	1
13C4 PFOS	87		50 - 150				08/27/18 11:31	08/28/18 17:07	1
13C5 PFNA	88		50 - 150				08/27/18 11:31	08/28/18 17:07	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-05

Lab Sample ID: 320-42343-15

Date Collected: 08/13/18 13:03

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.94	U M	1.9	0.43	ng/L		08/27/18 11:31	08/28/18 17:15	1
Perfluorohexanesulfonic acid (PFHxS)	1.4	J M	1.9	0.36	ng/L		08/27/18 11:31	08/28/18 17:15	1
Perfluoroheptanoic acid (PFHpA)	1.4	U M	1.9	0.57	ng/L		08/27/18 11:31	08/28/18 17:15	1
Perfluorooctanoic acid (PFOA)	2.8	M	1.9	0.51	ng/L		08/27/18 11:31	08/28/18 17:15	1
Perfluorooctanesulfonic acid (PFOS)	2.4	J M	3.8	1.0	ng/L		08/27/18 11:31	08/28/18 17:15	1
Perfluorononanoic acid (PFNA)	1.4	U M	1.9	0.49	ng/L		08/27/18 11:31	08/28/18 17:15	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	95		50 - 150				08/27/18 11:31	08/28/18 17:15	1
13C4-PFHpA	97		50 - 150				08/27/18 11:31	08/28/18 17:15	1
13C4 PFOA	93		50 - 150				08/27/18 11:31	08/28/18 17:15	1
13C3-PFBS	92		50 - 150				08/27/18 11:31	08/28/18 17:15	1
13C4 PFOS	88		50 - 150				08/27/18 11:31	08/28/18 17:15	1
13C5 PFNA	93		50 - 150				08/27/18 11:31	08/28/18 17:15	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-06

Lab Sample ID: 320-42343-16

Date Collected: 08/13/18 13:27

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.88	U M	1.8	0.41	ng/L		08/27/18 11:31	08/28/18 17:23	1
Perfluorohexanesulfonic acid (PFHxS)	1.3	J	1.8	0.34	ng/L		08/27/18 11:31	08/28/18 17:23	1
Perfluoroheptanoic acid (PFHpA)	1.3	U M	1.8	0.54	ng/L		08/27/18 11:31	08/28/18 17:23	1
Perfluorooctanoic acid (PFOA)	2.0	M	1.8	0.48	ng/L		08/27/18 11:31	08/28/18 17:23	1
Perfluorooctanesulfonic acid (PFOS)	1.0	J M	3.5	0.97	ng/L		08/27/18 11:31	08/28/18 17:23	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/27/18 11:31	08/28/18 17:23	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	94		50 - 150				08/27/18 11:31	08/28/18 17:23	1
13C4-PFHpA	91		50 - 150				08/27/18 11:31	08/28/18 17:23	1
13C4 PFOA	89		50 - 150				08/27/18 11:31	08/28/18 17:23	1
13C3-PFBS	89		50 - 150				08/27/18 11:31	08/28/18 17:23	1
13C4 PFOS	86		50 - 150				08/27/18 11:31	08/28/18 17:23	1
13C5 PFNA	91		50 - 150				08/27/18 11:31	08/28/18 17:23	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-07

Lab Sample ID: 320-42343-17

Date Collected: 08/13/18 15:10

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.4		1.8	0.41	ng/L		08/27/18 11:31	08/28/18 17:30	1
Perfluorohexanesulfonic acid (PFHxS)	13		1.8	0.34	ng/L		08/27/18 11:31	08/28/18 17:30	1
Perfluoroheptanoic acid (PFHpA)	1.0	J M	1.8	0.54	ng/L		08/27/18 11:31	08/28/18 17:30	1
Perfluorooctanoic acid (PFOA)	14	M	1.8	0.48	ng/L		08/27/18 11:31	08/28/18 17:30	1
Perfluorooctanesulfonic acid (PFOS)	5.7		3.5	0.97	ng/L		08/27/18 11:31	08/28/18 17:30	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		08/27/18 11:31	08/28/18 17:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	40	Q	50 - 150				08/27/18 11:31	08/28/18 17:30	1
13C4-PFHpA	44	Q	50 - 150				08/27/18 11:31	08/28/18 17:30	1
13C4 PFOA	43	Q	50 - 150				08/27/18 11:31	08/28/18 17:30	1
13C3-PFBS	38	Q	50 - 150				08/27/18 11:31	08/28/18 17:30	1
13C4 PFOS	38	Q	50 - 150				08/27/18 11:31	08/28/18 17:30	1
13C5 PFNA	40	Q	50 - 150				08/27/18 11:31	08/28/18 17:30	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.3	H M	1.8	0.41	ng/L		09/04/18 10:21	09/05/18 12:03	1
Perfluorohexanesulfonic acid (PFHxS)	12	H	1.8	0.34	ng/L		09/04/18 10:21	09/05/18 12:03	1
Perfluoroheptanoic acid (PFHpA)	1.3	J H M	1.8	0.54	ng/L		09/04/18 10:21	09/05/18 12:03	1
Perfluorooctanoic acid (PFOA)	14	H M	1.8	0.48	ng/L		09/04/18 10:21	09/05/18 12:03	1
Perfluorooctanesulfonic acid (PFOS)	5.1	H M	3.6	0.98	ng/L		09/04/18 10:21	09/05/18 12:03	1
Perfluorononanoic acid (PFNA)	1.3	U H M	1.8	0.46	ng/L		09/04/18 10:21	09/05/18 12:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	85		50 - 150				09/04/18 10:21	09/05/18 12:03	1
13C4-PFHpA	84		50 - 150				09/04/18 10:21	09/05/18 12:03	1
13C4 PFOA	83		50 - 150				09/04/18 10:21	09/05/18 12:03	1
13C3-PFBS	76		50 - 150				09/04/18 10:21	09/05/18 12:03	1
13C4 PFOS	84		50 - 150				09/04/18 10:21	09/05/18 12:03	1
13C5 PFNA	82		50 - 150				09/04/18 10:21	09/05/18 12:03	1

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW121-01

Lab Sample ID: 320-42343-18

Date Collected: 08/15/18 12:47

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.2	J M	3.0	0.69	ng/L		08/29/18 10:29	08/31/18 02:01	1
Perfluorohexanesulfonic acid (PFHxS)	12	M	3.0	0.57	ng/L		08/29/18 10:29	08/31/18 02:01	1
Perfluoroheptanoic acid (PFHpA)	5.7		3.0	0.91	ng/L		08/29/18 10:29	08/31/18 02:01	1
Perfluorooctanoic acid (PFOA)	7.0	M	3.0	0.81	ng/L		08/29/18 10:29	08/31/18 02:01	1
Perfluorooctanesulfonic acid (PFOS)	4.8	J	6.0	1.6	ng/L		08/29/18 10:29	08/31/18 02:01	1
Perfluorononanoic acid (PFNA)	1.3	J	3.0	0.78	ng/L		08/29/18 10:29	08/31/18 02:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	89		50 - 150				08/29/18 10:29	08/31/18 02:01	1
13C4-PFHpA	88		50 - 150				08/29/18 10:29	08/31/18 02:01	1
13C4 PFOA	92		50 - 150				08/29/18 10:29	08/31/18 02:01	1
13C3-PFBS	77		50 - 150				08/29/18 10:29	08/31/18 02:01	1
13C4 PFOS	87		50 - 150				08/29/18 10:29	08/31/18 02:01	1
13C5 PFNA	92		50 - 150				08/29/18 10:29	08/31/18 02:01	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW122-01

Lab Sample ID: 320-42343-19

Date Collected: 08/14/18 16:40

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	190		1.7	0.40	ng/L		08/27/18 11:31	08/28/18 17:45	1
Perfluorohexanesulfonic acid (PFHxS)	21		1.7	0.33	ng/L		08/27/18 11:31	08/28/18 17:45	1
Perfluoroheptanoic acid (PFHpA)	30		1.7	0.53	ng/L		08/27/18 11:31	08/28/18 17:45	1
Perfluorooctanoic acid (PFOA)	70		1.7	0.47	ng/L		08/27/18 11:31	08/28/18 17:45	1
Perfluorooctanesulfonic acid (PFOS)	52		3.5	0.95	ng/L		08/27/18 11:31	08/28/18 17:45	1
Perfluorononanoic acid (PFNA)	18	M	1.7	0.45	ng/L		08/27/18 11:31	08/28/18 17:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	76		50 - 150				08/27/18 11:31	08/28/18 17:45	1
13C4-PFHpA	77		50 - 150				08/27/18 11:31	08/28/18 17:45	1
13C4 PFOA	77		50 - 150				08/27/18 11:31	08/28/18 17:45	1
13C3-PFBS	74		50 - 150				08/27/18 11:31	08/28/18 17:45	1
13C4 PFOS	73		50 - 150				08/27/18 11:31	08/28/18 17:45	1
13C5 PFNA	79		50 - 150				08/27/18 11:31	08/28/18 17:45	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW124-01

Lab Sample ID: 320-42343-20

Date Collected: 08/14/18 14:36

Matrix: Water

Date Received: 08/21/18 08:00

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.7	M	1.8	0.40	ng/L		08/27/18 11:31	08/28/18 17:53	1
Perfluorohexanesulfonic acid (PFHxS)	41		1.8	0.33	ng/L		08/27/18 11:31	08/28/18 17:53	1
Perfluoroheptanoic acid (PFHpA)	9.4		1.8	0.54	ng/L		08/27/18 11:31	08/28/18 17:53	1
Perfluorooctanoic acid (PFOA)	15	M	1.8	0.47	ng/L		08/27/18 11:31	08/28/18 17:53	1
Perfluorooctanesulfonic acid (PFOS)	35		3.5	0.97	ng/L		08/27/18 11:31	08/28/18 17:53	1
Perfluorononanoic acid (PFNA)	1.6	J M	1.8	0.46	ng/L		08/27/18 11:31	08/28/18 17:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	55		50 - 150				08/27/18 11:31	08/28/18 17:53	1
13C4-PFHpA	60		50 - 150				08/27/18 11:31	08/28/18 17:53	1
13C4 PFOA	56		50 - 150				08/27/18 11:31	08/28/18 17:53	1
13C3-PFBS	55		50 - 150				08/27/18 11:31	08/28/18 17:53	1
13C4 PFOS	53		50 - 150				08/27/18 11:31	08/28/18 17:53	1
13C5 PFNA	57		50 - 150				08/27/18 11:31	08/28/18 17:53	1

Isotope Dilution Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PFHxS (50-150)	PFHpA (50-150)	PFOA (50-150)	3C3-PFBs (50-150)	PFOS (50-150)	PFNA (50-150)
320-42343-1	FAI18-TW115-01	90	91	90	85	83	93
320-42343-2	FAI18-TW115-02	89	92	93	87	88	93
320-42343-3	FAI18-TW115-03	84	87	92	74	76	84
320-42343-3 - DL	FAI18-TW115-03	81	86	88	80	78	84
320-42343-4	FAI18-TW115-04	85	85	92	80	81	84
320-42343-4 - DL	FAI18-TW115-04	88	91	94	83	86	87
320-42343-5	FAI18-TW115-05	88	95	96	78	76	72
320-42343-5 - DL	FAI18-TW115-05	84	92	95	94	80	86
320-42343-6	FAI18-TW115-06	85	89	89	78	82	94
320-42343-7	FAI18-TW116-01	81	79	89	74	80	90
320-42343-8	FAI18-TW117-01	95	98	92	86	89	92
320-42343-9	FAI18-TW118-01	82	78	89	67	79	91
320-42343-10	FAI18-TW119-01	80	83	84	77	73	78
320-42343-11	FAI18-TW120-01	91	93	90	87	85	91
320-42343-12	FAI18-TW120-02	90	93	91	89	88	93
320-42343-13	FAI18-TW120-03	92	90	92	85	86	90
320-42343-14	FAI18-TW120-04	95	90	89	89	87	88
320-42343-15	FAI18-TW120-05	95	97	93	92	88	93
320-42343-16	FAI18-TW120-06	94	91	89	89	86	91
320-42343-17	FAI18-TW120-07	40 Q	44 Q	43 Q	38 Q	38 Q	40 Q
320-42343-17 - RE	FAI18-TW120-07	85	84	83	76	84	82
320-42343-18	FAI18-TW121-01	89	88	92	77	87	92
320-42343-19	FAI18-TW122-01	76	77	77	74	73	79
320-42343-20	FAI18-TW124-01	55	60	56	55	53	57
LCS 320-242292/2-A	Lab Control Sample	97	96	95	96	91	97
LCS 320-242800/2-A	Lab Control Sample	92	90	92	85	90	91
LCS 320-243679/2-A	Lab Control Sample	96	95	95	92	99	99
LCSD 320-242292/3-A	Lab Control Sample Dup	92	94	91	92	88	94
LCSD 320-242800/3-A	Lab Control Sample Dup	91	97	94	81	89	92
MB 320-242292/1-A	Method Blank	98	96	96	89	96	97
MB 320-242800/1-A	Method Blank	89	90	95	82	87	94
MB 320-243679/1-A	Method Blank	100	96	100	94	100	101

Surrogate Legend

- PFHxS = 18O2 PFHxS
- PFHpA = 13C4-PFHpA
- PFOA = 13C4 PFOA
- 13C3-PFBS = 13C3-PFBS
- PFOS = 13C4 PFOS
- PFNA = 13C5 PFNA

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Lab Sample ID: MB 320-242292/1-A
Matrix: Water
Analysis Batch: 242701

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 242292

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		08/27/18 11:31	08/28/18 16:22	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		08/27/18 11:31	08/28/18 16:22	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		08/27/18 11:31	08/28/18 16:22	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		08/27/18 11:31	08/28/18 16:22	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.1	ng/L		08/27/18 11:31	08/28/18 16:22	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		08/27/18 11:31	08/28/18 16:22	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	98		50 - 150	08/27/18 11:31	08/28/18 16:22	1
13C4-PFHpA	96		50 - 150	08/27/18 11:31	08/28/18 16:22	1
13C4 PFOA	96		50 - 150	08/27/18 11:31	08/28/18 16:22	1
13C3-PFBS	89		50 - 150	08/27/18 11:31	08/28/18 16:22	1
13C4 PFOS	96		50 - 150	08/27/18 11:31	08/28/18 16:22	1
13C5 PFNA	97		50 - 150	08/27/18 11:31	08/28/18 16:22	1

Lab Sample ID: LCS 320-242292/2-A
Matrix: Water
Analysis Batch: 242701

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 242292

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	34.9		ng/L		99	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.2		ng/L		94	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	40.8		ng/L		102	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	42.9		ng/L		107	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	36.8		ng/L		99	82 - 112
Perfluorononanoic acid (PFNA)	40.0	42.7		ng/L		107	83 - 113

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	97		50 - 150
13C4-PFHpA	96		50 - 150
13C4 PFOA	95		50 - 150
13C3-PFBS	96		50 - 150
13C4 PFOS	91		50 - 150
13C5 PFNA	97		50 - 150

Lab Sample ID: LCSD 320-242292/3-A
Matrix: Water
Analysis Batch: 242701

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 242292

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	34.7		ng/L		98	87 - 120	0	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	34.4		ng/L		95	81 - 106	1	30
Perfluoroheptanoic acid (PFHpA)	40.0	40.7		ng/L		102	80 - 113	0	30
Perfluorooctanoic acid (PFOA)	40.0	40.0		ng/L		100	80 - 107	7	30

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: LCSD 320-242292/3-A
Matrix: Water
Analysis Batch: 242701

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 242292

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	37.1	35.5		ng/L		96	82 - 112	4	30
Perfluorononanoic acid (PFNA)	40.0	41.8		ng/L		104	83 - 113	2	30
		LCS L							
Isotope Dilution	%Recovery	Qualifier	Limits						
18O2 PFHxS	92		50 - 150						
13C4-PFHpA	94		50 - 150						
13C4 PFOA	91		50 - 150						
13C3-PFBS	92		50 - 150						
13C4 PFOS	88		50 - 150						
13C5 PFNA	94		50 - 150						

Lab Sample ID: MB 320-242800/1-A
Matrix: Water
Analysis Batch: 243265

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 242800

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		08/29/18 10:29	08/31/18 00:11	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		08/29/18 10:29	08/31/18 00:11	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		08/29/18 10:29	08/31/18 00:11	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		08/29/18 10:29	08/31/18 00:11	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U	4.0	1.1	ng/L		08/29/18 10:29	08/31/18 00:11	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		08/29/18 10:29	08/31/18 00:11	1
		MB MB							
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	89		50 - 150	08/29/18 10:29	08/31/18 00:11	1			
13C4-PFHpA	90		50 - 150	08/29/18 10:29	08/31/18 00:11	1			
13C4 PFOA	95		50 - 150	08/29/18 10:29	08/31/18 00:11	1			
13C3-PFBS	82		50 - 150	08/29/18 10:29	08/31/18 00:11	1			
13C4 PFOS	87		50 - 150	08/29/18 10:29	08/31/18 00:11	1			
13C5 PFNA	94		50 - 150	08/29/18 10:29	08/31/18 00:11	1			

Lab Sample ID: LCS 320-242800/2-A
Matrix: Water
Analysis Batch: 243265

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 242800

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	36.1		ng/L		102	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.3	M	ng/L		91	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	38.5		ng/L		96	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	39.3		ng/L		98	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	35.0		ng/L		94	82 - 112
Perfluorononanoic acid (PFNA)	40.0	39.7		ng/L		99	83 - 113
		LCS LCS					
Isotope Dilution	%Recovery	Qualifier	Limits				
18O2 PFHxS	92		50 - 150				
13C4-PFHpA	90		50 - 150				

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: LCS 320-242800/2-A
Matrix: Water
Analysis Batch: 243265

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 242800

<i>Isotope Dilution</i>	LCS LCS		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C4 PFOA	92		50 - 150
13C3-PFBS	85		50 - 150
13C4 PFOS	90		50 - 150
13C5 PFNA	91		50 - 150

Lab Sample ID: LCSD 320-242800/3-A
Matrix: Water
Analysis Batch: 243265

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 242800

<i>Analyte</i>	<i>Spike Added</i>	LCSD	LCSD	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
Perfluorobutanesulfonic acid (PFBS)	35.4	38.6		ng/L		109	87 - 120	7	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.7	M	ng/L		93	81 - 106	1	30
Perfluoroheptanoic acid (PFHpA)	40.0	36.1		ng/L		90	80 - 113	7	30
Perfluorooctanoic acid (PFOA)	40.0	38.6		ng/L		96	80 - 107	2	30
Perfluorooctanesulfonic acid (PFOS)	37.1	35.1		ng/L		94	82 - 112	0	30
Perfluorononanoic acid (PFNA)	40.0	41.5		ng/L		104	83 - 113	4	30

<i>Isotope Dilution</i>	LCSD LCSD		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
18O2 PFHxS	91		50 - 150
13C4-PFHpA	97		50 - 150
13C4 PFOA	94		50 - 150
13C3-PFBS	81		50 - 150
13C4 PFOS	89		50 - 150
13C5 PFNA	92		50 - 150

Lab Sample ID: MB 320-243679/1-A
Matrix: Water
Analysis Batch: 243906

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 243679

<i>Analyte</i>	MB MB		<i>LOQ</i>	<i>DL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
	<i>Result</i>	<i>Qualifier</i>							
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		09/04/18 10:19	09/05/18 11:48	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		09/04/18 10:19	09/05/18 11:48	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		09/04/18 10:19	09/05/18 11:48	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		09/04/18 10:19	09/05/18 11:48	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U M	4.0	1.1	ng/L		09/04/18 10:19	09/05/18 11:48	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		09/04/18 10:19	09/05/18 11:48	1

<i>Isotope Dilution</i>	MB MB		<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
	<i>%Recovery</i>	<i>Qualifier</i>				
18O2 PFHxS	100		50 - 150	09/04/18 10:19	09/05/18 11:48	1
13C4-PFHpA	96		50 - 150	09/04/18 10:19	09/05/18 11:48	1
13C4 PFOA	100		50 - 150	09/04/18 10:19	09/05/18 11:48	1
13C3-PFBS	94		50 - 150	09/04/18 10:19	09/05/18 11:48	1
13C4 PFOS	100		50 - 150	09/04/18 10:19	09/05/18 11:48	1
13C5 PFNA	101		50 - 150	09/04/18 10:19	09/05/18 11:48	1

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

LCMS

Prep Batch: 242292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42343-11	FAI18-TW120-01	Total/NA	Water	3535	
320-42343-12	FAI18-TW120-02	Total/NA	Water	3535	
320-42343-13	FAI18-TW120-03	Total/NA	Water	3535	
320-42343-14	FAI18-TW120-04	Total/NA	Water	3535	
320-42343-15	FAI18-TW120-05	Total/NA	Water	3535	
320-42343-16	FAI18-TW120-06	Total/NA	Water	3535	
320-42343-17	FAI18-TW120-07	Total/NA	Water	3535	
320-42343-19	FAI18-TW122-01	Total/NA	Water	3535	
320-42343-20	FAI18-TW124-01	Total/NA	Water	3535	
MB 320-242292/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-242292/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-242292/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 242701

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42343-11	FAI18-TW120-01	Total/NA	Water	EPA 537 (Mod)	242292
320-42343-12	FAI18-TW120-02	Total/NA	Water	EPA 537 (Mod)	242292
320-42343-13	FAI18-TW120-03	Total/NA	Water	EPA 537 (Mod)	242292
320-42343-14	FAI18-TW120-04	Total/NA	Water	EPA 537 (Mod)	242292
320-42343-15	FAI18-TW120-05	Total/NA	Water	EPA 537 (Mod)	242292
320-42343-16	FAI18-TW120-06	Total/NA	Water	EPA 537 (Mod)	242292
320-42343-17	FAI18-TW120-07	Total/NA	Water	EPA 537 (Mod)	242292
320-42343-19	FAI18-TW122-01	Total/NA	Water	EPA 537 (Mod)	242292
320-42343-20	FAI18-TW124-01	Total/NA	Water	EPA 537 (Mod)	242292
MB 320-242292/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	242292
LCS 320-242292/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	242292
LCSD 320-242292/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	242292

Prep Batch: 242800

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42343-1	FAI18-TW115-01	Total/NA	Water	3535	
320-42343-2	FAI18-TW115-02	Total/NA	Water	3535	
320-42343-3	FAI18-TW115-03	Total/NA	Water	3535	
320-42343-3 - DL	FAI18-TW115-03	Total/NA	Water	3535	
320-42343-4	FAI18-TW115-04	Total/NA	Water	3535	
320-42343-4 - DL	FAI18-TW115-04	Total/NA	Water	3535	
320-42343-5	FAI18-TW115-05	Total/NA	Water	3535	
320-42343-5 - DL	FAI18-TW115-05	Total/NA	Water	3535	
320-42343-6	FAI18-TW115-06	Total/NA	Water	3535	
320-42343-7	FAI18-TW116-01	Total/NA	Water	3535	
320-42343-8	FAI18-TW117-01	Total/NA	Water	3535	
320-42343-9	FAI18-TW118-01	Total/NA	Water	3535	
320-42343-10	FAI18-TW119-01	Total/NA	Water	3535	
320-42343-18	FAI18-TW121-01	Total/NA	Water	3535	
MB 320-242800/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-242800/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-242800/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 243265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42343-1	FAI18-TW115-01	Total/NA	Water	EPA 537 (Mod)	242800

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

LCMS (Continued)

Analysis Batch: 243265 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42343-2	FAI18-TW115-02	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-3	FAI18-TW115-03	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-4	FAI18-TW115-04	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-5	FAI18-TW115-05	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-6	FAI18-TW115-06	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-7	FAI18-TW116-01	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-8	FAI18-TW117-01	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-9	FAI18-TW118-01	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-10	FAI18-TW119-01	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-18	FAI18-TW121-01	Total/NA	Water	EPA 537 (Mod)	242800
MB 320-242800/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	242800
LCS 320-242800/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	242800
LCS 320-242800/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	242800

Prep Batch: 243679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42343-17 - RE	FAI18-TW120-07	Total/NA	Water	3535	
MB 320-243679/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-243679/2-A	Lab Control Sample	Total/NA	Water	3535	

Analysis Batch: 243801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42343-3 - DL	FAI18-TW115-03	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-4 - DL	FAI18-TW115-04	Total/NA	Water	EPA 537 (Mod)	242800
320-42343-5 - DL	FAI18-TW115-05	Total/NA	Water	EPA 537 (Mod)	242800

Analysis Batch: 243906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42343-17 - RE	FAI18-TW120-07	Total/NA	Water	EPA 537 (Mod)	243679
MB 320-243679/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	243679
LCS 320-243679/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	243679

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-01

Date Collected: 08/15/18 12:02

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42343-1

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	3535			285.1 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 00:35	JRB	TAL SAC

Client Sample ID: FAI18-TW115-02

Date Collected: 08/15/18 12:40

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42343-2

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	3535			282.3 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 00:43	JRB	TAL SAC

Client Sample ID: FAI18-TW115-03

Date Collected: 08/15/18 13:28

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42343-3

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	3535			279.6 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 00:50	JRB	TAL SAC
Total/NA	Prep	3535	DL		279.6 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	2			243801	09/04/18 22:19	S1M	TAL SAC

Client Sample ID: FAI18-TW115-04

Date Collected: 08/15/18 14:01

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42343-4

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	3535			287.1 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 00:58	JRB	TAL SAC
Total/NA	Prep	3535	DL		287.1 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	2			243801	09/04/18 22:27	S1M	TAL SAC

Client Sample ID: FAI18-TW115-05

Date Collected: 08/15/18 14:47

Date Received: 08/21/18 08:00

Lab Sample ID: 320-42343-5

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	3535			290.5 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 01:06	JRB	TAL SAC
Total/NA	Prep	3535	DL		290.5 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	10			243801	09/04/18 22:34	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW115-06

Lab Sample ID: 320-42343-6

Date Collected: 08/15/18 13:01

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			282 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 01:14	JRB	TAL SAC

Client Sample ID: FAI18-TW116-01

Lab Sample ID: 320-42343-7

Date Collected: 08/16/18 18:20

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			286.4 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 01:22	JRB	TAL SAC

Client Sample ID: FAI18-TW117-01

Lab Sample ID: 320-42343-8

Date Collected: 08/15/18 18:15

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			294.3 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 01:37	JRB	TAL SAC

Client Sample ID: FAI18-TW118-01

Lab Sample ID: 320-42343-9

Date Collected: 08/17/18 09:28

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			289.9 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 01:45	JRB	TAL SAC

Client Sample ID: FAI18-TW119-01

Lab Sample ID: 320-42343-10

Date Collected: 08/16/18 08:35

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			287.6 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 01:53	JRB	TAL SAC

Client Sample ID: FAI18-TW120-01

Lab Sample ID: 320-42343-11

Date Collected: 08/13/18 13:01

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			267.3 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 16:45	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-02

Lab Sample ID: 320-42343-12

Date Collected: 08/13/18 13:56

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			285.7 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 16:52	S1M	TAL SAC

Client Sample ID: FAI18-TW120-03

Lab Sample ID: 320-42343-13

Date Collected: 08/13/18 14:19

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			289.5 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 17:00	S1M	TAL SAC

Client Sample ID: FAI18-TW120-04

Lab Sample ID: 320-42343-14

Date Collected: 08/13/18 14:42

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			290.1 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 17:07	S1M	TAL SAC

Client Sample ID: FAI18-TW120-05

Lab Sample ID: 320-42343-15

Date Collected: 08/13/18 13:03

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			265.5 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 17:15	S1M	TAL SAC

Client Sample ID: FAI18-TW120-06

Lab Sample ID: 320-42343-16

Date Collected: 08/13/18 13:27

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			282.7 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 17:23	S1M	TAL SAC

Client Sample ID: FAI18-TW120-07

Lab Sample ID: 320-42343-17

Date Collected: 08/13/18 15:10

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			283.4 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 17:30	S1M	TAL SAC
Total/NA	Prep	3535	RE		280.7 mL	10.00 mL	243679	09/04/18 10:21	KMK	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Client Sample ID: FAI18-TW120-07

Lab Sample ID: 320-42343-17

Date Collected: 08/13/18 15:10

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 537 (Mod)	RE	1			243906	09/05/18 12:03	AAR	TAL SAC

Client Sample ID: FAI18-TW121-01

Lab Sample ID: 320-42343-18

Date Collected: 08/15/18 12:47

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			167.2 mL	10.0 mL	242800	08/29/18 10:29	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			243265	08/31/18 02:01	JRB	TAL SAC

Client Sample ID: FAI18-TW122-01

Lab Sample ID: 320-42343-19

Date Collected: 08/14/18 16:40

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			288.5 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 17:45	S1M	TAL SAC

Client Sample ID: FAI18-TW124-01

Lab Sample ID: 320-42343-20

Date Collected: 08/14/18 14:36

Matrix: Water

Date Received: 08/21/18 08:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			284.9 mL	10.00 mL	242292	08/27/18 11:31	KMK	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			242701	08/28/18 17:53	S1M	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-19

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Method Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod) 3535	PFAS for QSM 5.1, Table B-15 Solid-Phase Extraction (SPE)	DOD 5.1 SW846	TAL SAC TAL SAC

Protocol References:

DOD 5.1 = Department of Defense Quality Systems Manual V5.1

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Sample Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-42343-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42343-1	FAI18-TW115-01	Water	08/15/18 12:02	08/21/18 08:00
320-42343-2	FAI18-TW115-02	Water	08/15/18 12:40	08/21/18 08:00
320-42343-3	FAI18-TW115-03	Water	08/15/18 13:28	08/21/18 08:00
320-42343-4	FAI18-TW115-04	Water	08/15/18 14:01	08/21/18 08:00
320-42343-5	FAI18-TW115-05	Water	08/15/18 14:47	08/21/18 08:00
320-42343-6	FAI18-TW115-06	Water	08/15/18 13:01	08/21/18 08:00
320-42343-7	FAI18-TW116-01	Water	08/16/18 18:20	08/21/18 08:00
320-42343-8	FAI18-TW117-01	Water	08/15/18 18:15	08/21/18 08:00
320-42343-9	FAI18-TW118-01	Water	08/17/18 09:28	08/21/18 08:00
320-42343-10	FAI18-TW119-01	Water	08/16/18 08:35	08/21/18 08:00
320-42343-11	FAI18-TW120-01	Water	08/13/18 13:01	08/21/18 08:00
320-42343-12	FAI18-TW120-02	Water	08/13/18 13:56	08/21/18 08:00
320-42343-13	FAI18-TW120-03	Water	08/13/18 14:19	08/21/18 08:00
320-42343-14	FAI18-TW120-04	Water	08/13/18 14:42	08/21/18 08:00
320-42343-15	FAI18-TW120-05	Water	08/13/18 13:03	08/21/18 08:00
320-42343-16	FAI18-TW120-06	Water	08/13/18 13:27	08/21/18 08:00
320-42343-17	FAI18-TW120-07	Water	08/13/18 15:10	08/21/18 08:00
320-42343-18	FAI18-TW121-01	Water	08/15/18 12:47	08/21/18 08:00
320-42343-19	FAI18-TW122-01	Water	08/14/18 16:40	08/21/18 08:00
320-42343-20	FAI18-TW124-01	Water	08/14/18 14:36	08/21/18 08:00



R&M CONSULTANTS, INC.

CHAIN OF CUSTODY RECORD

Client:		R&M Consultants, Inc		Analytical Laboratory	TA-Sacramento	DOD Project#:	No	Cooler ID:	ZINC	Page	1	of	2
Project No. / NPDL No.:	2393.03	Project Name:	FAI PFAS										
Contact Name:	Christopher Fell	Phone Number:	907.646.9655										
Reports To:	Christopher Fell	Email:	cfell@rmconsult.com										
Invoice To:	Rodney Gurritz	Email:	rodney@arcticdataservices.com										
		R&M Consultants, Inc Attn: Accounting Department/Courtney Maillet 9101 Vanguard Drive, Anchorage, AK, 99507 cmaillet@rmconsult.com / 907.522.1707		PO #:	2393.03								
				Quote #:	32010764								
RESERVED for lab use		Sample Identification	LocID	Sampler	Date (mm/dd/yy)	Time (hhmm)	Matrix/ Matrix Code						
		FAI18-TW115-01	TW115	C. Fell	8/15/18	1202	WA	X					
		FAI18-TW115-02	TW115	C. Fell	8/15/18	1240	WA	X					
		FAI18-TW115-03	TW115	C. Fell	8/15/18	1328	WA	X					
		FAI18-TW115-04	TW115	C. Fell	8/15/18	1401	WA	X					
		FAI18-TW115-05	TW115	C. Fell	8/15/18	1447	WA	X					
		FAI18-TW115-06	TW115	C. Fell	8/15/18	1301	WA	X					
		FAI18-TW116-01	TW116	C. Fell	8/16/18	1820	WA	X					
		FAI18-TW117-01	TW117	C. Fell	8/15/18	1815	WA	X					
		FAI18-TW118-01	TW118	C. Fell	8/17/18	0928	WA	X					
		FAI18-TW119-01	TW119	C. Fell	8/16/18	0835	WA	X					
		FAI18-TW120-01	TW120	C. Fell	8/13/18	1301	WA	X					
		FAI18-TW120-02	TW120	C. Fell	8/13/18	1356	WA	X					
		FAI18-TW120-03	TW120	C. Fell	8/13/18	1419	WA	X					
		FAI18-TW120-04	TW120	C. Fell	8/13/18	1442	WA	X					
		FAI18-TW120-05	TW120	C. Fell	8/13/18	1303	WA	X					
		FAI18-TW120-06	TW120	C. Fell	8/13/18	1327	WA	X					
		FAI18-TW120-07	TW120	C. Fell	8/13/18	1510	WA	X					
		FAI18-TW121-01	TW121	C. Fell	8/15/18	1247	WA	X					
Reinquisitioned By (1):	<i>[Signature]</i>	Date:	8/20/18	Time:	10:25	Received By:	<i>[Signature]</i>	Time:	8/21/18	4:10 PM			
Reinquisitioned By (2):	<i>[Signature]</i>	Date:		Time:		Received By:		Time:					
Reinquisitioned By (3):	<i>[Signature]</i>	Date:		Time:		Received By:		Time:					
Reinquisitioned By (4):	<i>[Signature]</i>	Date:		Time:		Received For By Laboratory:		Time:					
No. Containers										Sample Type (i.e. Grab(c), Comp.(c), etc)			
Preservative/Analysis										0-6°C			
Turnaround Time, Deliverable Req., and/or Special Instructions										Standard TAT, Level 2 PDF Report and TotalAccess			
Laboratory Check In Information										Chain of Custody Seal (Circle):			
Temp Blank °C										Intact			
2/c										Broken			
										Absent			



Login Sample Receipt Checklist

Client: R&M Consultants, Inc

Job Number: 320-42343-1

Login Number: 42343

List Source: TestAmerica Sacramento

List Number: 1

Creator: Her, David A

Question	Answer	Comment
Did cooler come with a shipping slip (air bill, etc.)?	True	
If YES, enter carrier name and airbill number.	True	FEDEX 782389746838
Were custody seals on outside of cooler?	True	
How many & where?	True	2 FRONT & BACK
Seal Date/Seal Name	True	FRONT 8/20/18 187954 BACK 8/20/18 187953
Were custody seals unbroken and intact at the date and time of arrival?	True	
Were samples screened for radioactivity using the Geiger counter?	N/A	
Were custody papers in a plastic bag & taped inside to the lid?	True	
Were custody papers filled out properly (ink, signed , etc.)?	True	
Were custody papers signed in the appropriate place?	True	
Was the project identifiable from the custody papers?	True	
If YES, enter project name.	True	FAI PFAS
Were temperature blanks used?	True	
Cooler Temperature(s)/Thermometer ID No.	True	2.1 AK-3
Initials of designated person to acknowledge receipt of cooler.	True	
Describe type of packing in cooler	True	
Were all bottles sealed in separate plastic bags?	True	
Did all bottles arrive unbroken with labels in good condition?	True	
Were all bottle labels complete (ID, date, time, signature, preservative, etc.)?	True	
Did all bottle labels agree with custody papers?	True	
Were correct containers used for the tests indicated?	True	
Were samples preserved to correct pH, if applicable?	True	
Was a sufficient amount of sample sent for tests indicated?	True	
Were bubbles absent in the volatile organic analysis (VOA) samples?	N/A	
If NO, list VOA samples.	N/A	
Was the Project Manager called and status discussed?	N/A	
Who was called? By Whom?	N/A	

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: 320-43994-1
Client Project/Site: FAI PFAS

For:
R&M Consultants, Inc
9101 Vanguard Drive
Anchorage, Alaska 99507

Attn: Christopher Fell



Authorized for release by:
11/9/2018 2:35:31 PM

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

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

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

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

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Definitions/Glossary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.
E	Result exceeded calibration range.
D	The reported value is from a dilution.
Q	One or more quality control criteria failed.
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

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

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Job ID: 320-43994-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 10/9/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.5° C.

LCMS

Method(s) EPA 537 (Mod), EPA 537(Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) EPA 537 (Mod): The matrix spike (MS) recovery for Perfluoroheptanoic acid (PFHpA) for preparation batch 320-253015 and analytical batch 320-253903 was outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) EPA 537 (Mod): The matrix spike duplicate (MSD) recoveries for Perfluorooctanoic acid (PFOA) and Perfluorohexanesulfonic acid (PFHxS) for preparation batch 320-253015 and analytical batch 320-253903 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following samples exceeded the instrument calibration range: FAI18-TW219-02 (320-43994-4). These analytes have been qualified; however, the peaks did not saturate the instrument detector. The samples were diluted within calibration range, and both sets of data were reported.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) and Perfluorohexanesulfonic acid (PFHxS) associated with the following samples exceeded the instrument calibration range: FAI18-TW310-02 (320-43994-8). These analytes have been qualified; however, the peaks did not saturate the instrument detector. The samples were diluted within calibration range and both sets of data were reported.

Method(s) EPA 537 (Mod): Results for samples FAI18-TW219-02 (320-43994-4) and FAI18-TW310-02 (320-43994-8) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method(s) EPA 537 (Mod), EPA 537(Mod): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for M2-6:2 FTS in the following instrument blank: (ICB 320-255021/9). All of the subsequent calibration verification samples were in control for this IDA. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method(s) EPA 537 (Mod): Several Isotope Dilution Analyte (IDA) recoveries associated with the following sample are below the method recommended limit: FAI18-TW310-01 (320-43994-7). The sample was re-extracted outside of the holding time with IDA recoveries within control limits. Both sets of data are reported. 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.

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

Organic Prep

Method(s) 3535: The following sample was observed to have black sediment in the bottle prior to extraction: FAI18-WA-RS04 (320-43994-9).

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-253281.

Method(s) 3535: The following samples were observed to be yellow in color with a small layer of sediment that remained on the bottom of the container. While extracting, the sample had non-settleable particulate matter which plugged the SPE extraction disk. The amount of sample remaining plus the weight of the bottle are recorded in the "notes" field of the prep batch. The "tare weight" recorded is the weight of the emptied bottle: FAI18-TW218-02 (320-43994-2) and FAI18-TW310-01 (320-43994-7). The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3535: The following samples were decanted prior to preparation due to sediment at the bottom of the sample container. A and

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Job ID: 320-43994-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

after decanting the sample it was fortified with IDA and the aqueous portion was extracted: FAI18-TW219-02 (320-43994-4) and FAI18-TW310-01 (320-43994-7).

Method(s) 3535: The following sample FAI18-TW310-01 (320-43994-7) was observed to be yellow in color and contain sediment at the bottom of the container: FAI18-TW310-01 (320-43994-7).

Method(s) 3535: The following sample had non-settleable particulate matter which plugged the SPE extraction disk. The amount of sample remaining plus the weight of the bottle are recorded in the "notes" field of the prep batch. The "tare weight" recorded is the weight of the emptied bottle: FAI18-TW219-02 (320-43994-4). The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-253390.

Method(s) 3535: The initial volumes used for the following samples deviated from the standard procedure as the samples were noted to contain AFFF: FAI18-TW302-01 (320-43994-5) and FAI18-TW302-02 (320-43994-6). The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-256135.

Method(s) 3535: The following sample was re-prepared outside of preparation holding time due to low IDA recoveries: FAI18-TW310-01 (320-43994-7).

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

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW218-01

Lab Sample ID: 320-43994-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.9	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.79	J M	1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.7	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.7	J M	3.4	0.92	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW218-02

Lab Sample ID: 320-43994-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15	M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8	M	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	4.1	M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	11		3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW219-01

Lab Sample ID: 320-43994-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	11	M	1.8	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	61		1.8	0.34	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.2	M	1.8	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	17	M	1.8	0.48	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	150		3.5	0.98	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW219-02

Lab Sample ID: 320-43994-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	16	M	2.1	0.49	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	77		2.1	0.41	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.7	M	2.1	0.65	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	17	M	2.1	0.58	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	460	E	4.3	1.2	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	14	D	11	2.5	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	83	D	11	2.0	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	5.2	J D M	11	3.3	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	17	D M	11	2.9	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	530	D	21	5.9	ng/L	5		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW302-01

Lab Sample ID: 320-43994-5

No Detections.

Client Sample ID: FAI18-TW302-02

Lab Sample ID: 320-43994-6

No Detections.

Client Sample ID: FAI18-TW310-01

Lab Sample ID: 320-43994-7

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW310-01 (Continued)

Lab Sample ID: 320-43994-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14	M	1.7	0.40	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	130	M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	10	M	1.7	0.53	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	73	M	1.7	0.47	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	100	M	3.5	0.96	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	13	M H	2.0	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	100	M H	2.0	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	10	M H	2.0	0.61	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	54	M H	2.0	0.54	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	60	M H	4.0	1.1	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW310-02

Lab Sample ID: 320-43994-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	92	M	1.7	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	590	E	1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	21	M	1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	240	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	910	E	3.3	0.92	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	97	D	8.3	1.9	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	710	D	8.3	1.6	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	21	D M	8.3	2.5	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	76	D M	8.3	2.3	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	990	D	17	4.6	ng/L	5		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-WA-RS04

Lab Sample ID: 320-43994-9

No Detections.

Client Sample ID: FAI18-WA-RS05

Lab Sample ID: 320-43994-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.34	J M	1.7	0.31	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW218-01

Lab Sample ID: 320-43994-1

Date Collected: 10/05/18 10:10

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.9	M	1.7	0.39	ng/L		10/19/18 04:37	10/23/18 04:11	1
Perfluorohexanesulfonic acid (PFHxS)	15		1.7	0.32	ng/L		10/19/18 04:37	10/23/18 04:11	1
Perfluoroheptanoic acid (PFHpA)	0.79	J M	1.7	0.51	ng/L		10/19/18 04:37	10/23/18 04:11	1
Perfluorooctanoic acid (PFOA)	2.7	M	1.7	0.45	ng/L		10/19/18 04:37	10/23/18 04:11	1
Perfluorooctanesulfonic acid (PFOS)	2.7	J M	3.4	0.92	ng/L		10/19/18 04:37	10/23/18 04:11	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		10/19/18 04:37	10/23/18 04:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	83		50 - 150				10/19/18 04:37	10/23/18 04:11	1
13C4 PFHpA	89		50 - 150				10/19/18 04:37	10/23/18 04:11	1
13C4 PFOA	82		50 - 150				10/19/18 04:37	10/23/18 04:11	1
13C3 PFBS	77		50 - 150				10/19/18 04:37	10/23/18 04:11	1
13C4 PFOS	80		50 - 150				10/19/18 04:37	10/23/18 04:11	1
13C5 PFNA	83		50 - 150				10/19/18 04:37	10/23/18 04:11	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW218-02

Lab Sample ID: 320-43994-2

Date Collected: 10/05/18 09:11

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14	M	1.7	0.40	ng/L		10/19/18 04:37	10/23/18 04:19	1
Perfluorohexanesulfonic acid (PFHxS)	15	M	1.7	0.33	ng/L		10/19/18 04:37	10/23/18 04:19	1
Perfluoroheptanoic acid (PFHpA)	1.8	M	1.7	0.53	ng/L		10/19/18 04:37	10/23/18 04:19	1
Perfluorooctanoic acid (PFOA)	4.1	M	1.7	0.47	ng/L		10/19/18 04:37	10/23/18 04:19	1
Perfluorooctanesulfonic acid (PFOS)	11		3.5	0.96	ng/L		10/19/18 04:37	10/23/18 04:19	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		10/19/18 04:37	10/23/18 04:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	66		50 - 150				10/19/18 04:37	10/23/18 04:19	1
13C4 PFHpA	62		50 - 150				10/19/18 04:37	10/23/18 04:19	1
13C4 PFOA	66		50 - 150				10/19/18 04:37	10/23/18 04:19	1
13C3 PFBS	57		50 - 150				10/19/18 04:37	10/23/18 04:19	1
13C4 PFOS	61		50 - 150				10/19/18 04:37	10/23/18 04:19	1
13C5 PFNA	62		50 - 150				10/19/18 04:37	10/23/18 04:19	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW219-01

Lab Sample ID: 320-43994-3

Date Collected: 10/05/18 13:09

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	11	M	1.8	0.41	ng/L		10/19/18 04:37	10/23/18 04:26	1
Perfluorohexanesulfonic acid (PFHxS)	61		1.8	0.34	ng/L		10/19/18 04:37	10/23/18 04:26	1
Perfluoroheptanoic acid (PFHpA)	3.2	M	1.8	0.54	ng/L		10/19/18 04:37	10/23/18 04:26	1
Perfluorooctanoic acid (PFOA)	17	M	1.8	0.48	ng/L		10/19/18 04:37	10/23/18 04:26	1
Perfluorooctanesulfonic acid (PFOS)	150		3.5	0.98	ng/L		10/19/18 04:37	10/23/18 04:26	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.8	0.46	ng/L		10/19/18 04:37	10/23/18 04:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	80		50 - 150				10/19/18 04:37	10/23/18 04:26	1
13C4 PFHpA	81		50 - 150				10/19/18 04:37	10/23/18 04:26	1
13C4 PFOA	87		50 - 150				10/19/18 04:37	10/23/18 04:26	1
13C3 PFBS	76		50 - 150				10/19/18 04:37	10/23/18 04:26	1
13C4 PFOS	81		50 - 150				10/19/18 04:37	10/23/18 04:26	1
13C5 PFNA	84		50 - 150				10/19/18 04:37	10/23/18 04:26	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW219-02

Lab Sample ID: 320-43994-4

Date Collected: 10/05/18 12:00

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	16	M	2.1	0.49	ng/L		10/19/18 04:37	10/23/18 04:34	1
Perfluorohexanesulfonic acid (PFHxS)	77		2.1	0.41	ng/L		10/19/18 04:37	10/23/18 04:34	1
Perfluoroheptanoic acid (PFHpA)	4.7	M	2.1	0.65	ng/L		10/19/18 04:37	10/23/18 04:34	1
Perfluorooctanoic acid (PFOA)	17	M	2.1	0.58	ng/L		10/19/18 04:37	10/23/18 04:34	1
Perfluorooctanesulfonic acid (PFOS)	460	E	4.3	1.2	ng/L		10/19/18 04:37	10/23/18 04:34	1
Perfluorononanoic acid (PFNA)	1.6	U M	2.1	0.56	ng/L		10/19/18 04:37	10/23/18 04:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	76		50 - 150				10/19/18 04:37	10/23/18 04:34	1
13C4 PFHpA	74		50 - 150				10/19/18 04:37	10/23/18 04:34	1
13C4 PFOA	75		50 - 150				10/19/18 04:37	10/23/18 04:34	1
13C3 PFBS	70		50 - 150				10/19/18 04:37	10/23/18 04:34	1
13C4 PFOS	71		50 - 150				10/19/18 04:37	10/23/18 04:34	1
13C5 PFNA	70		50 - 150				10/19/18 04:37	10/23/18 04:34	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14	D	11	2.5	ng/L		10/19/18 04:37	10/28/18 16:22	5
Perfluorohexanesulfonic acid (PFHxS)	83	D	11	2.0	ng/L		10/19/18 04:37	10/28/18 16:22	5
Perfluoroheptanoic acid (PFHpA)	5.2	J D M	11	3.3	ng/L		10/19/18 04:37	10/28/18 16:22	5
Perfluorooctanoic acid (PFOA)	17	D M	11	2.9	ng/L		10/19/18 04:37	10/28/18 16:22	5
Perfluorooctanesulfonic acid (PFOS)	530	D	21	5.9	ng/L		10/19/18 04:37	10/28/18 16:22	5
Perfluorononanoic acid (PFNA)	8.0	U M	11	2.8	ng/L		10/19/18 04:37	10/28/18 16:22	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	59		50 - 150				10/19/18 04:37	10/28/18 16:22	5
13C4 PFHpA	74		50 - 150				10/19/18 04:37	10/28/18 16:22	5
13C4 PFOA	72		50 - 150				10/19/18 04:37	10/28/18 16:22	5
13C3 PFBS	79		50 - 150				10/19/18 04:37	10/28/18 16:22	5
13C4 PFOS	59		50 - 150				10/19/18 04:37	10/28/18 16:22	5
13C5 PFNA	65		50 - 150				10/19/18 04:37	10/28/18 16:22	5

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW302-01

Lab Sample ID: 320-43994-5

Date Collected: 10/05/18 17:36

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	U	2500	580	ng/L		10/19/18 11:03	11/07/18 18:13	1
Perfluorohexanesulfonic acid (PFHxS)	1300	U M	2500	480	ng/L		10/19/18 11:03	11/07/18 18:13	1
Perfluoroheptanoic acid (PFHpA)	1900	U	2500	760	ng/L		10/19/18 11:03	11/07/18 18:13	1
Perfluorooctanoic acid (PFOA)	1900	U M	2500	680	ng/L		10/19/18 11:03	11/07/18 18:13	1
Perfluorooctanesulfonic acid (PFOS)	3800	U M	5000	1400	ng/L		10/19/18 11:03	11/07/18 18:13	1
Perfluorononanoic acid (PFNA)	1900	U	2500	650	ng/L		10/19/18 11:03	11/07/18 18:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	99	M	50 - 150				10/19/18 11:03	11/07/18 18:13	1
13C4 PFHpA	99		50 - 150				10/19/18 11:03	11/07/18 18:13	1
13C4 PFOA	97		50 - 150				10/19/18 11:03	11/07/18 18:13	1
13C3 PFBS	94	M	50 - 150				10/19/18 11:03	11/07/18 18:13	1
13C4 PFOS	99		50 - 150				10/19/18 11:03	11/07/18 18:13	1
13C5 PFNA	98		50 - 150				10/19/18 11:03	11/07/18 18:13	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW302-02

Lab Sample ID: 320-43994-6

Date Collected: 10/05/18 16:49

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	U	2500	580	ng/L		10/19/18 11:03	11/07/18 18:21	1
Perfluorohexanesulfonic acid (PFHxS)	1300	U M	2500	480	ng/L		10/19/18 11:03	11/07/18 18:21	1
Perfluoroheptanoic acid (PFHpA)	1900	U	2500	760	ng/L		10/19/18 11:03	11/07/18 18:21	1
Perfluorooctanoic acid (PFOA)	1900	U M	2500	680	ng/L		10/19/18 11:03	11/07/18 18:21	1
Perfluorooctanesulfonic acid (PFOS)	3800	U M	5000	1400	ng/L		10/19/18 11:03	11/07/18 18:21	1
Perfluorononanoic acid (PFNA)	1900	U M	2500	650	ng/L		10/19/18 11:03	11/07/18 18:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	96		50 - 150				10/19/18 11:03	11/07/18 18:21	1
13C4 PFHpA	101		50 - 150				10/19/18 11:03	11/07/18 18:21	1
13C4 PFOA	99		50 - 150				10/19/18 11:03	11/07/18 18:21	1
13C3 PFBS	96	M	50 - 150				10/19/18 11:03	11/07/18 18:21	1
13C4 PFOS	108		50 - 150				10/19/18 11:03	11/07/18 18:21	1
13C5 PFNA	97		50 - 150				10/19/18 11:03	11/07/18 18:21	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW310-01

Lab Sample ID: 320-43994-7

Date Collected: 10/05/18 15:10

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14	M	1.7	0.40	ng/L		10/19/18 04:37	10/23/18 04:41	1
Perfluorohexanesulfonic acid (PFHxS)	130	M	1.7	0.33	ng/L		10/19/18 04:37	10/23/18 04:41	1
Perfluoroheptanoic acid (PFHpA)	10	M	1.7	0.53	ng/L		10/19/18 04:37	10/23/18 04:41	1
Perfluorooctanoic acid (PFOA)	73	M	1.7	0.47	ng/L		10/19/18 04:37	10/23/18 04:41	1
Perfluorooctanesulfonic acid (PFOS)	100	M	3.5	0.96	ng/L		10/19/18 04:37	10/23/18 04:41	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.45	ng/L		10/19/18 04:37	10/23/18 04:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	37	Q	50 - 150				10/19/18 04:37	10/23/18 04:41	1
13C4 PFHpA	36	Q	50 - 150				10/19/18 04:37	10/23/18 04:41	1
13C4 PFOA	36	Q	50 - 150				10/19/18 04:37	10/23/18 04:41	1
13C3 PFBS	35	Q	50 - 150				10/19/18 04:37	10/23/18 04:41	1
13C4 PFOS	39	Q	50 - 150				10/19/18 04:37	10/23/18 04:41	1
13C5 PFNA	37	Q	50 - 150				10/19/18 04:37	10/23/18 04:41	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	13	M H	2.0	0.46	ng/L		10/31/18 12:33	11/01/18 06:26	1
Perfluorohexanesulfonic acid (PFHxS)	100	M H	2.0	0.38	ng/L		10/31/18 12:33	11/01/18 06:26	1
Perfluoroheptanoic acid (PFHpA)	10	M H	2.0	0.61	ng/L		10/31/18 12:33	11/01/18 06:26	1
Perfluorooctanoic acid (PFOA)	54	M H	2.0	0.54	ng/L		10/31/18 12:33	11/01/18 06:26	1
Perfluorooctanesulfonic acid (PFOS)	60	M H	4.0	1.1	ng/L		10/31/18 12:33	11/01/18 06:26	1
Perfluorononanoic acid (PFNA)	1.5	U M H	2.0	0.52	ng/L		10/31/18 12:33	11/01/18 06:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	82		50 - 150				10/31/18 12:33	11/01/18 06:26	1
13C4 PFHpA	74		50 - 150				10/31/18 12:33	11/01/18 06:26	1
13C4 PFOA	89		50 - 150				10/31/18 12:33	11/01/18 06:26	1
13C3 PFBS	81		50 - 150				10/31/18 12:33	11/01/18 06:26	1
13C4 PFOS	93	M	50 - 150				10/31/18 12:33	11/01/18 06:26	1
13C5 PFNA	98		50 - 150				10/31/18 12:33	11/01/18 06:26	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW310-02

Lab Sample ID: 320-43994-8

Date Collected: 10/05/18 14:25

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	92	M	1.7	0.38	ng/L		10/19/18 04:37	10/23/18 04:49	1
Perfluorohexanesulfonic acid (PFHxS)	590	E	1.7	0.32	ng/L		10/19/18 04:37	10/23/18 04:49	1
Perfluoroheptanoic acid (PFHpA)	21	M	1.7	0.51	ng/L		10/19/18 04:37	10/23/18 04:49	1
Perfluorooctanoic acid (PFOA)	240	M	1.7	0.45	ng/L		10/19/18 04:37	10/23/18 04:49	1
Perfluorooctanesulfonic acid (PFOS)	910	E	3.3	0.92	ng/L		10/19/18 04:37	10/23/18 04:49	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.43	ng/L		10/19/18 04:37	10/23/18 04:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	65		50 - 150				10/19/18 04:37	10/23/18 04:49	1
13C4 PFHpA	64		50 - 150				10/19/18 04:37	10/23/18 04:49	1
13C4 PFOA	71		50 - 150				10/19/18 04:37	10/23/18 04:49	1
13C3 PFBS	64		50 - 150				10/19/18 04:37	10/23/18 04:49	1
13C4 PFOS	62		50 - 150				10/19/18 04:37	10/23/18 04:49	1
13C5 PFNA	65		50 - 150				10/19/18 04:37	10/23/18 04:49	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	97	D	8.3	1.9	ng/L		10/19/18 04:37	10/28/18 16:37	5
Perfluorohexanesulfonic acid (PFHxS)	710	D	8.3	1.6	ng/L		10/19/18 04:37	10/28/18 16:37	5
Perfluoroheptanoic acid (PFHpA)	21	D M	8.3	2.5	ng/L		10/19/18 04:37	10/28/18 16:37	5
Perfluorooctanoic acid (PFOA)	76	D M	8.3	2.3	ng/L		10/19/18 04:37	10/28/18 16:37	5
Perfluorooctanesulfonic acid (PFOS)	990	D	17	4.6	ng/L		10/19/18 04:37	10/28/18 16:37	5
Perfluorononanoic acid (PFNA)	6.3	U M	8.3	2.2	ng/L		10/19/18 04:37	10/28/18 16:37	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	62		50 - 150				10/19/18 04:37	10/28/18 16:37	5
13C4 PFHpA	72		50 - 150				10/19/18 04:37	10/28/18 16:37	5
13C4 PFOA	73		50 - 150				10/19/18 04:37	10/28/18 16:37	5
13C3 PFBS	65		50 - 150				10/19/18 04:37	10/28/18 16:37	5
13C4 PFOS	66		50 - 150				10/19/18 04:37	10/28/18 16:37	5
13C5 PFNA	73		50 - 150				10/19/18 04:37	10/28/18 16:37	5

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-WA-RS04

Lab Sample ID: 320-43994-9

Date Collected: 10/04/18 16:22

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.83	U	1.7	0.38	ng/L		10/18/18 03:14	10/22/18 04:05	1
Perfluorohexanesulfonic acid (PFHxS)	0.83	U	1.7	0.32	ng/L		10/18/18 03:14	10/22/18 04:05	1
Perfluoroheptanoic acid (PFHpA)	1.2	U	1.7	0.51	ng/L		10/18/18 03:14	10/22/18 04:05	1
Perfluorooctanoic acid (PFOA)	1.2	U	1.7	0.45	ng/L		10/18/18 03:14	10/22/18 04:05	1
Perfluorooctanesulfonic acid (PFOS)	2.5	U M	3.3	0.92	ng/L		10/18/18 03:14	10/22/18 04:05	1
Perfluorononanoic acid (PFNA)	1.2	U	1.7	0.43	ng/L		10/18/18 03:14	10/22/18 04:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	82		50 - 150				10/18/18 03:14	10/22/18 04:05	1
13C4 PFHpA	81		50 - 150				10/18/18 03:14	10/22/18 04:05	1
13C4 PFOA	87		50 - 150				10/18/18 03:14	10/22/18 04:05	1
13C3 PFBS	75		50 - 150				10/18/18 03:14	10/22/18 04:05	1
13C4 PFOS	89		50 - 150				10/18/18 03:14	10/22/18 04:05	1
13C5 PFNA	90		50 - 150				10/18/18 03:14	10/22/18 04:05	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-WA-RS05

Lab Sample ID: 320-43994-10

Date Collected: 10/05/18 11:15

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.83	U M	1.7	0.38	ng/L		10/19/18 04:37	10/23/18 04:56	1
Perfluorohexanesulfonic acid (PFHxS)	0.34	J M	1.7	0.31	ng/L		10/19/18 04:37	10/23/18 04:56	1
Perfluoroheptanoic acid (PFHpA)	1.2	U	1.7	0.50	ng/L		10/19/18 04:37	10/23/18 04:56	1
Perfluorooctanoic acid (PFOA)	1.2	U M	1.7	0.45	ng/L		10/19/18 04:37	10/23/18 04:56	1
Perfluorooctanesulfonic acid (PFOS)	2.5	U M	3.3	0.91	ng/L		10/19/18 04:37	10/23/18 04:56	1
Perfluorononanoic acid (PFNA)	1.2	U	1.7	0.43	ng/L		10/19/18 04:37	10/23/18 04:56	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	91		50 - 150				10/19/18 04:37	10/23/18 04:56	1
13C4 PFHpA	86		50 - 150				10/19/18 04:37	10/23/18 04:56	1
13C4 PFOA	90		50 - 150				10/19/18 04:37	10/23/18 04:56	1
13C3 PFBS	86		50 - 150				10/19/18 04:37	10/23/18 04:56	1
13C4 PFOS	97		50 - 150				10/19/18 04:37	10/23/18 04:56	1
13C5 PFNA	97		50 - 150				10/19/18 04:37	10/23/18 04:56	1

Isotope Dilution Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PFHxS (50-150)	PFHpA (50-150)	PFOA (50-150)	3C3-PFBs (50-150)	PFOS (50-150)	PFNA (50-150)
320-43994-1	FAI18-TW218-01	83	89	82	77	80	83
320-43994-2	FAI18-TW218-02	66	62	66	57	61	62
320-43994-3	FAI18-TW219-01	80	81	87	76	81	84
320-43994-4	FAI18-TW219-02	76	74	75	70	71	70
320-43994-4 - DL	FAI18-TW219-02	59	74	72	79	59	65
320-43994-5	FAI18-TW302-01	99 M	99	97	94 M	99	98
320-43994-6	FAI18-TW302-02	96	101	99	96 M	108	97
320-43994-7	FAI18-TW310-01	37 Q	36 Q	36 Q	35 Q	39 Q	37 Q
320-43994-7 - RE	FAI18-TW310-01	82	74	89	81	93 M	98
320-43994-8	FAI18-TW310-02	65	64	71	64	62	65
320-43994-8 - DL	FAI18-TW310-02	62	72	73	65	66	73
320-43994-9	FAI18-WA-RS04	82	81	87	75	89	90
320-43994-10	FAI18-WA-RS05	91	86	90	86	97	97
LCS 320-253015/2-A	Lab Control Sample	85	93	94	71	96	97
LCS 320-253281/2-A	Lab Control Sample	95	98	89	94	97	87
LCS 320-253390/2-A	Lab Control Sample	98	93	91	90	94	85
LCS 320-256135/2-A	Lab Control Sample	72	70	79	71	75	82
LCSD 320-253281/3-A	Lab Control Sample Dup	87	94	89	92	87	81
LCSD 320-253390/3-A	Lab Control Sample Dup	101	97	94	93	104	102
LCSD 320-256135/3-A	Lab Control Sample Dup	74	77	76	72	79	82
MB 320-253015/1-A	Method Blank	91	84	93	72	86	91
MB 320-253281/1-A	Method Blank	89	91	89	94	92	88
MB 320-253390/1-A	Method Blank	97	96	96	96	98	96
MB 320-256135/1-A	Method Blank	78	81	82	69	83	85

Surrogate Legend

- PFHxS = 18O2 PFHxS
- PFHpA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- 13C3-PFBS = 13C3 PFBS
- PFOS = 13C4 PFOS
- PFNA = 13C5 PFNA

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Lab Sample ID: MB 320-253015/1-A
Matrix: Water
Analysis Batch: 253903

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 253015

Analyte	MB	MB	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluorooctanoic acid (PFOA)	1.5	U M	2.0	0.54	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U M	4.0	1.1	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		10/18/18 03:14	10/22/18 02:42	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	91		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C4 PFHpA	84		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C4 PFOA	93		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C3 PFBS	72		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C4 PFOS	86		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C5 PFNA	91		50 - 150	10/18/18 03:14	10/22/18 02:42	1

Lab Sample ID: LCS 320-253015/2-A
Matrix: Water
Analysis Batch: 253903

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 253015

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits
		Result	Qualifier				
Perfluorobutanesulfonic acid (PFBS)	35.4	41.4		ng/L		117	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.5		ng/L		100	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	38.4		ng/L		96	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	42.5		ng/L		106	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	37.3		ng/L		100	82 - 112
Perfluorononanoic acid (PFNA)	40.0	39.3		ng/L		98	83 - 113

Isotope Dilution	LCS	LCS	Limits
	%Recovery	Qualifier	
18O2 PFHxS	85		50 - 150
13C4 PFHpA	93		50 - 150
13C4 PFOA	94		50 - 150
13C3 PFBS	71		50 - 150
13C4 PFOS	96		50 - 150
13C5 PFNA	97		50 - 150

Lab Sample ID: MB 320-253281/1-A
Matrix: Water
Analysis Batch: 254057

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 253281

Analyte	MB	MB	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		10/19/18 08:21	10/23/18 02:33	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U M	2.0	0.38	ng/L		10/19/18 08:21	10/23/18 02:33	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		10/19/18 08:21	10/23/18 02:33	1
Perfluorooctanoic acid (PFOA)	1.5	U	2.0	0.54	ng/L		10/19/18 08:21	10/23/18 02:33	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U M	4.0	1.1	ng/L		10/19/18 08:21	10/23/18 02:33	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		10/19/18 08:21	10/23/18 02:33	1

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	89		50 - 150	10/19/18 08:21	10/23/18 02:33	1
13C4 PFHpA	91		50 - 150	10/19/18 08:21	10/23/18 02:33	1
13C4 PFOA	89		50 - 150	10/19/18 08:21	10/23/18 02:33	1
13C3 PFBS	94		50 - 150	10/19/18 08:21	10/23/18 02:33	1
13C4 PFOS	92		50 - 150	10/19/18 08:21	10/23/18 02:33	1
13C5 PFNA	88		50 - 150	10/19/18 08:21	10/23/18 02:33	1

Lab Sample ID: LCS 320-253281/2-A
Matrix: Water
Analysis Batch: 254057

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 253281

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	33.6		ng/L		95	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.7		ng/L		98	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	37.8		ng/L		94	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	40.3		ng/L		101	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	34.4		ng/L		93	82 - 112
Perfluorononanoic acid (PFNA)	40.0	44.3		ng/L		111	83 - 113

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	95		50 - 150
13C4 PFHpA	98		50 - 150
13C4 PFOA	89		50 - 150
13C3 PFBS	94		50 - 150
13C4 PFOS	97		50 - 150
13C5 PFNA	87		50 - 150

Lab Sample ID: LCSD 320-253281/3-A
Matrix: Water
Analysis Batch: 254057

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 253281

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	32.0		ng/L		90	87 - 120	5	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	35.8		ng/L		98	81 - 106	0	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.3		ng/L		96	80 - 113	1	30
Perfluorooctanoic acid (PFOA)	40.0	43.0		ng/L		107	80 - 107	6	30
Perfluorooctanesulfonic acid (PFOS)	37.1	34.7		ng/L		94	82 - 112	1	30
Perfluorononanoic acid (PFNA)	40.0	40.4		ng/L		101	83 - 113	9	30

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
18O2 PFHxS	87		50 - 150
13C4 PFHpA	94		50 - 150
13C4 PFOA	89		50 - 150
13C3 PFBS	92		50 - 150
13C4 PFOS	87		50 - 150
13C5 PFNA	81		50 - 150

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: MB 320-253390/1-A
Matrix: Water
Analysis Batch: 254395

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 253390

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	130	U	250	58	ng/L		10/19/18 11:03	10/24/18 07:06	1
Perfluorohexanesulfonic acid (PFHxS)	130	U	250	48	ng/L		10/19/18 11:03	10/24/18 07:06	1
Perfluoroheptanoic acid (PFHpA)	190	U	250	76	ng/L		10/19/18 11:03	10/24/18 07:06	1
Perfluorooctanoic acid (PFOA)	190	U M	250	68	ng/L		10/19/18 11:03	10/24/18 07:06	1
Perfluorooctanesulfonic acid (PFOS)	380	U	500	140	ng/L		10/19/18 11:03	10/24/18 07:06	1
Perfluorononanoic acid (PFNA)	190	U	250	65	ng/L		10/19/18 11:03	10/24/18 07:06	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	97		50 - 150	10/19/18 11:03	10/24/18 07:06	1
13C4 PFHpA	96		50 - 150	10/19/18 11:03	10/24/18 07:06	1
13C4 PFOA	96		50 - 150	10/19/18 11:03	10/24/18 07:06	1
13C3 PFBS	96		50 - 150	10/19/18 11:03	10/24/18 07:06	1
13C4 PFOS	98		50 - 150	10/19/18 11:03	10/24/18 07:06	1
13C5 PFNA	96		50 - 150	10/19/18 11:03	10/24/18 07:06	1

Lab Sample ID: LCS 320-253390/2-A
Matrix: Water
Analysis Batch: 254395

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 253390

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	4420	4130		ng/L		93	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	4550	3890		ng/L		85	81 - 106
Perfluoroheptanoic acid (PFHpA)	5000	4400		ng/L		88	80 - 113
Perfluorooctanoic acid (PFOA)	5010	4770		ng/L		95	80 - 107
Perfluorooctanesulfonic acid (PFOS)	4640	4210		ng/L		91	82 - 112
Perfluorononanoic acid (PFNA)	5000	5090		ng/L		102	83 - 113

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	98		50 - 150
13C4 PFHpA	93		50 - 150
13C4 PFOA	91		50 - 150
13C3 PFBS	90		50 - 150
13C4 PFOS	94		50 - 150
13C5 PFNA	85		50 - 150

Lab Sample ID: LCSD 320-253390/3-A
Matrix: Water
Analysis Batch: 254395

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 253390

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	4420	4240		ng/L		96	87 - 120	3	30
Perfluorohexanesulfonic acid (PFHxS)	4550	4100		ng/L		90	81 - 106	5	30
Perfluoroheptanoic acid (PFHpA)	5000	5060		ng/L		101	80 - 113	14	30
Perfluorooctanoic acid (PFOA)	5010	5240		ng/L		105	80 - 107	9	30

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: LCSD 320-253390/3-A

Matrix: Water

Analysis Batch: 254395

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 253390

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	4640	4410		ng/L		95	82 - 112	5	30
Perfluorononanoic acid (PFNA)	5000	4940		ng/L		99	83 - 113	3	30

Isotope Dilution	LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	101		50 - 150
13C4 PFHpA	97		50 - 150
13C4 PFOA	94		50 - 150
13C3 PFBS	93		50 - 150
13C4 PFOS	104		50 - 150
13C5 PFNA	102		50 - 150

Lab Sample ID: MB 320-256135/1-A

Matrix: Water

Analysis Batch: 256282

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 256135

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		10/31/18 12:33	11/01/18 05:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.398	J M	2.0	0.38	ng/L		10/31/18 12:33	11/01/18 05:49	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		10/31/18 12:33	11/01/18 05:49	1
Perfluorooctanoic acid (PFOA)	1.5	U M	2.0	0.54	ng/L		10/31/18 12:33	11/01/18 05:49	1
Perfluorooctanesulfonic acid (PFOS)	1.67	J M	4.0	1.1	ng/L		10/31/18 12:33	11/01/18 05:49	1
Perfluorononanoic acid (PFNA)	1.5	U M	2.0	0.52	ng/L		10/31/18 12:33	11/01/18 05:49	1

Isotope Dilution	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	78		50 - 150	10/31/18 12:33	11/01/18 05:49	1
13C4 PFHpA	81		50 - 150	10/31/18 12:33	11/01/18 05:49	1
13C4 PFOA	82		50 - 150	10/31/18 12:33	11/01/18 05:49	1
13C3 PFBS	69		50 - 150	10/31/18 12:33	11/01/18 05:49	1
13C4 PFOS	83		50 - 150	10/31/18 12:33	11/01/18 05:49	1
13C5 PFNA	85		50 - 150	10/31/18 12:33	11/01/18 05:49	1

Lab Sample ID: LCS 320-256135/2-A

Matrix: Water

Analysis Batch: 256282

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 256135

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	34.7		ng/L		98	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	32.7		ng/L		90	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	38.6		ng/L		97	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	35.8		ng/L		89	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	36.6		ng/L		99	82 - 112
Perfluorononanoic acid (PFNA)	40.0	36.4		ng/L		91	83 - 113

Isotope Dilution	LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	72		50 - 150
13C4 PFHpA	70		50 - 150

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: LCS 320-256135/2-A
Matrix: Water
Analysis Batch: 256282

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 256135

<i>Isotope Dilution</i>	<i>LCS LCS</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C4 PFOA	79		50 - 150
13C3 PFBS	71		50 - 150
13C4 PFOS	75		50 - 150
13C5 PFNA	82		50 - 150

Lab Sample ID: LCSD 320-256135/3-A
Matrix: Water
Analysis Batch: 256282

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 256135

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD Result</i>	<i>LCSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec.</i>		<i>RPD</i>	<i>RPD Limit</i>
							<i>Limits</i>	<i>RPD</i>		
Perfluorobutanesulfonic acid (PFBS)	35.4	36.0		ng/L		102	87 - 120	4	30	
Perfluorohexanesulfonic acid (PFHxS)	36.4	32.8		ng/L		90	81 - 106	0	30	
Perfluoroheptanoic acid (PFHpA)	40.0	36.2		ng/L		91	80 - 113	6	30	
Perfluorooctanoic acid (PFOA)	40.0	37.6		ng/L		94	80 - 107	5	30	
Perfluorooctanesulfonic acid (PFOS)	37.1	39.6		ng/L		107	82 - 112	8	30	
Perfluorononanoic acid (PFNA)	40.0	37.7		ng/L		94	83 - 113	3	30	

<i>Isotope Dilution</i>	<i>LCSD LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
18O2 PFHxS	74		50 - 150
13C4 PFHpA	77		50 - 150
13C4 PFOA	76		50 - 150
13C3 PFBS	72		50 - 150
13C4 PFOS	79		50 - 150
13C5 PFNA	82		50 - 150

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

LCMS

Prep Batch: 253015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-9	FAI18-WA-RS04	Total/NA	Water	3535	
MB 320-253015/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-253015/2-A	Lab Control Sample	Total/NA	Water	3535	

Prep Batch: 253281

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-1	FAI18-TW218-01	Total/NA	Water	3535	
320-43994-2	FAI18-TW218-02	Total/NA	Water	3535	
320-43994-3	FAI18-TW219-01	Total/NA	Water	3535	
320-43994-4	FAI18-TW219-02	Total/NA	Water	3535	
320-43994-4 - DL	FAI18-TW219-02	Total/NA	Water	3535	
320-43994-7	FAI18-TW310-01	Total/NA	Water	3535	
320-43994-8 - DL	FAI18-TW310-02	Total/NA	Water	3535	
320-43994-8	FAI18-TW310-02	Total/NA	Water	3535	
320-43994-10	FAI18-WA-RS05	Total/NA	Water	3535	
MB 320-253281/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-253281/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-253281/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Prep Batch: 253390

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-5	FAI18-TW302-01	Total/NA	Water	3535	
320-43994-6	FAI18-TW302-02	Total/NA	Water	3535	
MB 320-253390/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-253390/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-253390/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 253903

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-9	FAI18-WA-RS04	Total/NA	Water	EPA 537 (Mod)	253015
MB 320-253015/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	253015
LCS 320-253015/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	253015

Analysis Batch: 254057

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-1	FAI18-TW218-01	Total/NA	Water	EPA 537 (Mod)	253281
320-43994-2	FAI18-TW218-02	Total/NA	Water	EPA 537 (Mod)	253281
320-43994-3	FAI18-TW219-01	Total/NA	Water	EPA 537 (Mod)	253281
320-43994-4	FAI18-TW219-02	Total/NA	Water	EPA 537 (Mod)	253281
320-43994-7	FAI18-TW310-01	Total/NA	Water	EPA 537 (Mod)	253281
320-43994-8	FAI18-TW310-02	Total/NA	Water	EPA 537 (Mod)	253281
320-43994-10	FAI18-WA-RS05	Total/NA	Water	EPA 537 (Mod)	253281
MB 320-253281/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	253281
LCS 320-253281/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	253281
LCSD 320-253281/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	253281

Analysis Batch: 254395

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-253390/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	253390
LCS 320-253390/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	253390
LCSD 320-253390/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	253390

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Analysis Batch: 255438

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-4 - DL	FAI18-TW219-02	Total/NA	Water	EPA 537 (Mod)	253281
320-43994-8 - DL	FAI18-TW310-02	Total/NA	Water	EPA 537 (Mod)	253281

Prep Batch: 256135

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-7 - RE	FAI18-TW310-01	Total/NA	Water	3535	
MB 320-256135/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-256135/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-256135/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 256282

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-7 - RE	FAI18-TW310-01	Total/NA	Water	EPA 537 (Mod)	256135
MB 320-256135/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	256135
LCS 320-256135/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	256135
LCSD 320-256135/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	256135

Analysis Batch: 257632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43994-5	FAI18-TW302-01	Total/NA	Water	EPA 537 (Mod)	253390
320-43994-6	FAI18-TW302-02	Total/NA	Water	EPA 537 (Mod)	253390

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW218-01

Date Collected: 10/05/18 10:10

Date Received: 10/09/18 09:30

Lab Sample ID: 320-43994-1

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	3535			297.3 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			254057	10/23/18 04:11	D1R	TAL SAC

Client Sample ID: FAI18-TW218-02

Date Collected: 10/05/18 09:11

Date Received: 10/09/18 09:30

Lab Sample ID: 320-43994-2

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	3535			287.9 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			254057	10/23/18 04:19	D1R	TAL SAC

Client Sample ID: FAI18-TW219-01

Date Collected: 10/05/18 13:09

Date Received: 10/09/18 09:30

Lab Sample ID: 320-43994-3

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	3535			282 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			254057	10/23/18 04:26	D1R	TAL SAC

Client Sample ID: FAI18-TW219-02

Date Collected: 10/05/18 12:00

Date Received: 10/09/18 09:30

Lab Sample ID: 320-43994-4

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	3535			233.8 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			254057	10/23/18 04:34	D1R	TAL SAC
Total/NA	Prep	3535	DL		233.8 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	5			255438	10/28/18 16:22	S1M	TAL SAC

Client Sample ID: FAI18-TW302-01

Date Collected: 10/05/18 17:36

Date Received: 10/09/18 09:30

Lab Sample ID: 320-43994-5

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	3535			0.2 mL	10.00 mL	253390	10/19/18 11:03	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			257632	11/07/18 18:13	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Client Sample ID: FAI18-TW302-02

Lab Sample ID: 320-43994-6

Date Collected: 10/05/18 16:49

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			0.2 mL	10.00 mL	253390	10/19/18 11:03	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			257632	11/07/18 18:21	S1M	TAL SAC

Client Sample ID: FAI18-TW310-01

Lab Sample ID: 320-43994-7

Date Collected: 10/05/18 15:10

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	RE		250.4 mL	10.00 mL	256135	10/31/18 12:33	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			256282	11/01/18 06:26	S1M	TAL SAC
Total/NA	Prep	3535			287.6 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			254057	10/23/18 04:41	D1R	TAL SAC

Client Sample ID: FAI18-TW310-02

Lab Sample ID: 320-43994-8

Date Collected: 10/05/18 14:25

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			299.9 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			254057	10/23/18 04:49	D1R	TAL SAC
Total/NA	Prep	3535	DL		299.9 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	5			255438	10/28/18 16:37	S1M	TAL SAC

Client Sample ID: FAI18-WA-RS04

Lab Sample ID: 320-43994-9

Date Collected: 10/04/18 16:22

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			300.1 mL	10.00 mL	253015	10/18/18 03:14	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			253903	10/22/18 04:05	S1M	TAL SAC

Client Sample ID: FAI18-WA-RS05

Lab Sample ID: 320-43994-10

Date Collected: 10/05/18 11:15

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			302.6 mL	10.00 mL	253281	10/19/18 04:37	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			254057	10/23/18 04:56	D1R	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-19

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Method Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod) 3535	PFAS for QSM 5.1, Table B-15 Solid-Phase Extraction (SPE)	DOD 5.1 SW846	TAL SAC TAL SAC

Protocol References:

DOD 5.1 = Department of Defense Quality Systems Manual V5.1

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Sample Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43994-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-43994-1	FAI18-TW218-01	Water	10/05/18 10:10	10/09/18 09:30
320-43994-2	FAI18-TW218-02	Water	10/05/18 09:11	10/09/18 09:30
320-43994-3	FAI18-TW219-01	Water	10/05/18 13:09	10/09/18 09:30
320-43994-4	FAI18-TW219-02	Water	10/05/18 12:00	10/09/18 09:30
320-43994-5	FAI18-TW302-01	Water	10/05/18 17:36	10/09/18 09:30
320-43994-6	FAI18-TW302-02	Water	10/05/18 16:49	10/09/18 09:30
320-43994-7	FAI18-TW310-01	Water	10/05/18 15:10	10/09/18 09:30
320-43994-8	FAI18-TW310-02	Water	10/05/18 14:25	10/09/18 09:30
320-43994-9	FAI18-WA-RS04	Water	10/04/18 16:22	10/09/18 09:30
320-43994-10	FAI18-WA-RS05	Water	10/05/18 11:15	10/09/18 09:30

WORK ORDER # _____ CLIENT: Rad M Consultants PROJECT: FAI PFAS

Date/Time Cooler Arrived 10/18/18 9:45 Cooler signed for by: Andrew Pilch
(Print name)

Preliminary Examination Phase:

Date cooler opened: same as date received or ____/____/____ Cooler ID: Barium
Cooler opened by (print) Andrew Pilch (sign) _____

1. Delivered by ALASKA AIRLINES Fed-Ex UPS NAC LYNDEN CLIENT Other: _____
Shipment Tracking # if applicable _____ (include copy of shipping papers in file)

2. Number of Custody Seals 2 Signed by _____ Date ____/____/____

Were custody seals unbroken and intact on arrival? Yes No

3. Were custody papers sealed in a plastic bag? Yes No

4. Were custody papers filled out properly (ink, signed, etc.)? Yes No

5. Did you sign the custody papers in the appropriate place? Yes No

6. Was ice used? Yes No Type of ice: blue ice gel ice real ice dry ice Condition of Ice: hard

Temperature: Blank 1.0 °C (corrected) Cooler _____ °C (corrected) Thermometer # Rec #5

7. Packing in Cooler: bubble wrap Styrofoam cardboard Other: _____

8. Did samples arrive in plastic bags? Yes No

9. Did all bottles arrive unbroken, and with labels in good condition? Yes No

10. Are all bottle labels complete (ID, date, time, etc.)? Yes No

11. Do bottle labels and Chain of Custody agree? Yes No

12. Are the containers and preservatives correct for the tests indicated? Yes No

13. Is there adequate volume for the tests requested? Yes No

14. Are there dry weight containers provided? Yes No N/A

15. Were VOA vials free of bubbles? Yes No N/A

If "NO" which containers contained "head space" or bubbles? _____

16. Are methanol soils immersed in methanol? Yes No N/A

Log-in Phase:

Date of sample log-in ____/____/____

Samples logged in by (print) _____ (sign) _____

1. Was project, bid or quote identifiable from custody papers? Yes No

2. Do Turn Around Times and Due Dates agree? Yes No

3. Was the Project Manager notified of any RUSH status? Yes No

4. Was the Lab notified of RUSH or short hold status? Yes No

5. Was the COC scanned and copied? Yes No

Login Sample Receipt Checklist

Client: R&M Consultants, Inc

Job Number: 320-43994-1

Login Number: 43994
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Did cooler come with a shipping slip (air bill, etc.)?	True	
If YES, enter carrier name and airbill number.	True	PO Fedex / 7734-2175-6750
Were custody seals on outside of cooler?	True	
How many & where?	True	1 front
Seal Date/Seal Name	True	seal / 10/8/10
Were custody seals unbroken and intact at the date and time of arrival?	True	
Were samples screened for radioactivity using the Geiger counter?	N/A	
Were custody papers in a plastic bag & taped inside to the lid?	True	
Were custody papers filled out properly (ink, signed , etc.)?	True	
Were custody papers signed in the appropriate place?	True	
Was the project identifiable from the custody papers?	True	
If YES, enter project name.	True	FAI PFAS
Were temperature blanks used?	True	
Cooler Temperature(s)/Thermometer ID No.	True	3.5C / AK-5
Initials of designated person to acknowledge receipt of cooler.	True	MG
Describe type of packing in cooler	True	BUBBLE WRAP
Were all bottles sealed in separate plastic bags?	True	
Did all bottles arrive unbroken with labels in good condition?	True	
Were all bottle labels complete (ID, date, time, signature, preservative, etc.)?	True	
Did all bottle labels agree with custody papers?	True	
Were correct containers used for the tests indicated?	True	
Were samples preserved to correct pH, if applicable?	True	
Was a sufficient amount of sample sent for tests indicated?	True	
Were bubbles absent in the volatile organic analysis (VOA) samples?	True	
If NO, list VOA samples.	True	
Was the Project Manager called and status discussed?	N/A	
Who was called? By Whom?	True	

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: 320-43995-1
Client Project/Site: FAI PFAS

For:
R&M Consultants, Inc
9101 Vanguard Drive
Anchorage, Alaska 99507

Attn: Christopher Fell



Authorized for release by:
11/15/2018 3:51:43 PM

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

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

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

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

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Definitions/Glossary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
H	Sample was prepped or analyzed beyond the specified holding time
E	Result exceeded calibration range.
D	The reported value is from a dilution.

Glossary

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

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Job ID: 320-43995-1

Laboratory: TestAmerica Sacramento

Narrative

Receipt

The samples were received on 10/9/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.2° C.

LCMS

Method(s) EPA 537 (Mod), EPA 537(Mod): The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) EPA 537 (Mod): The matrix spike (MS) recovery for Perfluoroheptanoic acid (PFHpA) for preparation batch 320-253015 and analytical batch 320-253903 was outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) EPA 537 (Mod): The matrix spike duplicate (MSD) recoveries for Perfluorooctanoic acid (PFOA) and Perfluorohexanesulfonic acid (PFHxS) for preparation batch 320-253015 and analytical batch 320-253903 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) EPA 537 (Mod): The concentration of Perfluorooctanesulfonic acid (PFOS) associated with the following sample exceeded the instrument calibration range: FAI18-TW208-01 (320-43995-6). This analyte has been qualified; however, the peak did not saturate the instrument detector. The sample was diluted within calibration range and both sets of data were reported.

Method(s) EPA 537 (Mod): Results for sample FAI18-TW208-01 (320-43995-6) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method(s) EPA 537 (Mod), EPA 537(Mod): The isotope Dilution Analyte (IDA) recovery is above the method recommended limit for M2-6:2 FTS in the following instrument blank: (ICB 320-255021/9). All of the subsequent calibration verification samples were in control for this IDA. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method(s) EPA 537 (Mod): The following sample was diluted to bring the concentration of Perfluorooctanesulfonic acid (PFOS) within the calibration range: FAI18-TW208-01 (320-43995-6). Elevated reporting limits (RLs) are provided.

Method(s) EPA 537 (Mod): The concentration of Perfluorohexanesulfonic acid (PFHxS) associated with the following sample exceeded the instrument calibration range: FAI18-TW207-03 (320-43995-5). This analyte has been qualified; however, the peaks did not saturate the instrument detector. The sample was also analyzed at dilution to bring the analyte within the calibration range and both sets of data were reported.

Method(s) EPA 537 (Mod): The following samples were inadvertently prepped at dilution as suspected AFFF samples: FAI18-TW207-03 (320-43995-5) and FAI18-SW201-01 (320-43995-11). The samples were later confirmed to not be AFFF samples and were re-extracted outside holding time at full volume. Both sets of data were reported. Elevated reporting limits (RLs) are provided for the initial extraction.

Method(s) EPA 537 (Mod): Results for sample FAI18-TW207-03 (320-43995-5) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method(s) EPA 537 (Mod): The following sample was diluted to bring the concentration of Perfluorohexanesulfonic acid (PFHxS) within the calibration range: FAI18-TW207-03 (320-43995-5). Elevated reporting limits (RLs) are provided.

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

Organic Prep

Method(s) 3535: The following samples are yellow with orange sediments at the bottom of the bottle prior to extraction: FAI18-TW208-01 (320-43995-6), FAI18-TW210-01 (320-43995-7) and FAI18-TW211-01 (320-43995-8).

Case Narrative

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Job ID: 320-43995-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

Method(s) 3535: The following samples had non-settleable particulate matter which plugged the SPE extraction disk. The amount of sample remaining plus the weight of the bottle are recorded in the "Notes" field of the pre batch. The "Tare Weight" recorded is the weight of the emptied bottle : FAI18-TW208-01 (320-43995-6), FAI18-TW210-01 (320-43995-7) and FAI18-TW211-01 (320-43995-8). The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-253385.

Method(s) 3535: Due to the samples being AFFF and needing dilution, the initial volumes used for the following samples deviated from the standard procedure: FAI18-TW207-01 (320-43995-3), FAI18-TW207-02 (320-43995-4), FAI18-TW207-03 (320-43995-5), FAI18-TW216-01 (320-43995-9), FAI18-TW216-02 (320-43995-10) and FAI18-SW201-01 (320-43995-11). The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-258300.

Method(s) 3535: The following samples were re-prepared outside of preparation holding time due to being prepped as an AFFF samples in the original extraction, per the method comments. Since the samples are not true AFFF samples, they needed to be re-prepped at full volume: FAI18-TW207-03 (320-43995-5) and FAI18-SW201-01 (320-43995-11).

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

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW123-01

Lab Sample ID: 320-43995-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.2	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	32		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.8	M	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	5.9	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	14		3.4	0.93	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW202-01

Lab Sample ID: 320-43995-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.1	J M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.0	M	1.7	0.33	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.9		1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.0	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.5	M	3.4	0.94	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW207-01

Lab Sample ID: 320-43995-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	780	J M	2500	480	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW207-02

Lab Sample ID: 320-43995-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	670	J	2500	480	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW207-03

Lab Sample ID: 320-43995-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	850	J	2500	480	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	110	H	1.9	0.43	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	580	H E	1.9	0.36	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	16	H M	1.9	0.58	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	180	H	1.9	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	130	H M	3.8	1.0	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - REDL	120	H D	9.4	2.2	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - REDL	700	H D	9.4	1.8	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - REDL	130	H D	9.4	2.9	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - REDL	180	H D M	9.4	2.5	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - REDL	140	H D	19	5.2	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA) - REDL	100	H D	9.4	2.5	ng/L	5		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW208-01

Lab Sample ID: 320-43995-6

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW208-01 (Continued)

Lab Sample ID: 320-43995-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	41	M	1.7	0.38	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	120		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.4	M	1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	18	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	370	E	3.3	0.92	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	41	D	8.3	1.9	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	110	D	8.3	1.6	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	4.7	J D M	8.3	2.5	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	18	D M	8.3	2.3	ng/L	5		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	410	D	17	4.6	ng/L	5		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW210-01

Lab Sample ID: 320-43995-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	21	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	60		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.3	M	1.7	0.52	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	8.6	M	1.7	0.46	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	91		3.4	0.94	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.71	J M	1.7	0.44	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW211-01

Lab Sample ID: 320-43995-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	6.5	M	1.7	0.39	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	21		1.7	0.32	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.2		1.7	0.51	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	7.6	M	1.7	0.45	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	82		3.4	0.92	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.96	J M	1.7	0.44	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW216-01

Lab Sample ID: 320-43995-9

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	530	J M	2500	480	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-TW216-02

Lab Sample ID: 320-43995-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	640	J M	2500	480	ng/L	1		EPA 537 (Mod)	Total/NA

Client Sample ID: FAI18-SW201-01

Lab Sample ID: 320-43995-11

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS) - RE	1.6	J H M	1.9	0.36	ng/L	1		EPA 537 (Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	1.2	J H	3.8	1.0	ng/L	1		EPA 537 (Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW123-01

Lab Sample ID: 320-43995-1

Date Collected: 10/04/18 11:10

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.2	M	1.7	0.39	ng/L		10/18/18 03:14	10/22/18 04:12	1
Perfluorohexanesulfonic acid (PFHxS)	32		1.7	0.32	ng/L		10/18/18 03:14	10/22/18 04:12	1
Perfluoroheptanoic acid (PFHpA)	6.8	M	1.7	0.52	ng/L		10/18/18 03:14	10/22/18 04:12	1
Perfluorooctanoic acid (PFOA)	5.9	M	1.7	0.46	ng/L		10/18/18 03:14	10/22/18 04:12	1
Perfluorooctanesulfonic acid (PFOS)	14		3.4	0.93	ng/L		10/18/18 03:14	10/22/18 04:12	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		10/18/18 03:14	10/22/18 04:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	88		50 - 150				10/18/18 03:14	10/22/18 04:12	1
13C4 PFHpA	87		50 - 150				10/18/18 03:14	10/22/18 04:12	1
13C4 PFOA	91		50 - 150				10/18/18 03:14	10/22/18 04:12	1
13C3 PFBS	87		50 - 150				10/18/18 03:14	10/22/18 04:12	1
13C4 PFOS	99		50 - 150				10/18/18 03:14	10/22/18 04:12	1
13C5 PFNA	94		50 - 150				10/18/18 03:14	10/22/18 04:12	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW202-01

Lab Sample ID: 320-43995-2

Date Collected: 10/04/18 12:33

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.1	J M	1.7	0.39	ng/L		10/18/18 03:14	10/22/18 04:20	1
Perfluorohexanesulfonic acid (PFHxS)	4.0	M	1.7	0.33	ng/L		10/18/18 03:14	10/22/18 04:20	1
Perfluoroheptanoic acid (PFHpA)	4.9		1.7	0.52	ng/L		10/18/18 03:14	10/22/18 04:20	1
Perfluorooctanoic acid (PFOA)	2.0	M	1.7	0.46	ng/L		10/18/18 03:14	10/22/18 04:20	1
Perfluorooctanesulfonic acid (PFOS)	3.5	M	3.4	0.94	ng/L		10/18/18 03:14	10/22/18 04:20	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.44	ng/L		10/18/18 03:14	10/22/18 04:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	85		50 - 150				10/18/18 03:14	10/22/18 04:20	1
13C4 PFHpA	81		50 - 150				10/18/18 03:14	10/22/18 04:20	1
13C4 PFOA	87		50 - 150				10/18/18 03:14	10/22/18 04:20	1
13C3 PFBS	75		50 - 150				10/18/18 03:14	10/22/18 04:20	1
13C4 PFOS	92		50 - 150				10/18/18 03:14	10/22/18 04:20	1
13C5 PFNA	89		50 - 150				10/18/18 03:14	10/22/18 04:20	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW207-01

Lab Sample ID: 320-43995-3

Date Collected: 10/05/18 19:52

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	U M	2500	580	ng/L		10/19/18 10:51	11/07/18 17:13	1
Perfluorohexanesulfonic acid (PFHxS)	780	J M	2500	480	ng/L		10/19/18 10:51	11/07/18 17:13	1
Perfluoroheptanoic acid (PFHpA)	1900	U	2500	760	ng/L		10/19/18 10:51	11/07/18 17:13	1
Perfluorooctanoic acid (PFOA)	1900	U M	2500	680	ng/L		10/19/18 10:51	11/07/18 17:13	1
Perfluorooctanesulfonic acid (PFOS)	3800	U M	5000	1400	ng/L		10/19/18 10:51	11/07/18 17:13	1
Perfluorononanoic acid (PFNA)	1900	U M	2500	650	ng/L		10/19/18 10:51	11/07/18 17:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	89		50 - 150				10/19/18 10:51	11/07/18 17:13	1
13C4 PFHpA	101		50 - 150				10/19/18 10:51	11/07/18 17:13	1
13C4 PFOA	101		50 - 150				10/19/18 10:51	11/07/18 17:13	1
13C3 PFBS	91	M	50 - 150				10/19/18 10:51	11/07/18 17:13	1
13C4 PFOS	95		50 - 150				10/19/18 10:51	11/07/18 17:13	1
13C5 PFNA	96		50 - 150				10/19/18 10:51	11/07/18 17:13	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW207-02

Lab Sample ID: 320-43995-4

Date Collected: 10/05/18 18:55

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	U M	2500	580	ng/L		10/19/18 10:51	11/07/18 17:21	1
Perfluorohexanesulfonic acid (PFHxS)	670	J	2500	480	ng/L		10/19/18 10:51	11/07/18 17:21	1
Perfluoroheptanoic acid (PFHpA)	1900	U	2500	760	ng/L		10/19/18 10:51	11/07/18 17:21	1
Perfluorooctanoic acid (PFOA)	1900	U	2500	680	ng/L		10/19/18 10:51	11/07/18 17:21	1
Perfluorooctanesulfonic acid (PFOS)	3800	U M	5000	1400	ng/L		10/19/18 10:51	11/07/18 17:21	1
Perfluorononanoic acid (PFNA)	1900	U	2500	650	ng/L		10/19/18 10:51	11/07/18 17:21	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	89		50 - 150				10/19/18 10:51	11/07/18 17:21	1
13C4 PFHpA	89		50 - 150				10/19/18 10:51	11/07/18 17:21	1
13C4 PFOA	93		50 - 150				10/19/18 10:51	11/07/18 17:21	1
13C3 PFBS	87	M	50 - 150				10/19/18 10:51	11/07/18 17:21	1
13C4 PFOS	96		50 - 150				10/19/18 10:51	11/07/18 17:21	1
13C5 PFNA	94		50 - 150				10/19/18 10:51	11/07/18 17:21	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW207-03

Lab Sample ID: 320-43995-5

Date Collected: 10/05/18 19:54

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	U	2500	580	ng/L		10/19/18 10:51	11/07/18 17:28	1
Perfluorohexanesulfonic acid (PFHxS)	850	J	2500	480	ng/L		10/19/18 10:51	11/07/18 17:28	1
Perfluoroheptanoic acid (PFHpA)	1900	U	2500	760	ng/L		10/19/18 10:51	11/07/18 17:28	1
Perfluorooctanoic acid (PFOA)	1900	U M	2500	680	ng/L		10/19/18 10:51	11/07/18 17:28	1
Perfluorooctanesulfonic acid (PFOS)	3800	U M	5000	1400	ng/L		10/19/18 10:51	11/07/18 17:28	1
Perfluorononanoic acid (PFNA)	1900	U M	2500	650	ng/L		10/19/18 10:51	11/07/18 17:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	89		50 - 150				10/19/18 10:51	11/07/18 17:28	1
13C4 PFHpA	97		50 - 150				10/19/18 10:51	11/07/18 17:28	1
13C4 PFOA	98		50 - 150				10/19/18 10:51	11/07/18 17:28	1
13C3 PFBS	94	M	50 - 150				10/19/18 10:51	11/07/18 17:28	1
13C4 PFOS	96		50 - 150				10/19/18 10:51	11/07/18 17:28	1
13C5 PFNA	95		50 - 150				10/19/18 10:51	11/07/18 17:28	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	110	H	1.9	0.43	ng/L		11/10/18 04:47	11/14/18 03:35	1
Perfluorohexanesulfonic acid (PFHxS)	580	H E	1.9	0.36	ng/L		11/10/18 04:47	11/14/18 03:35	1
Perfluoroheptanoic acid (PFHpA)	16	H M	1.9	0.58	ng/L		11/10/18 04:47	11/14/18 03:35	1
Perfluorooctanoic acid (PFOA)	180	H	1.9	0.51	ng/L		11/10/18 04:47	11/14/18 03:35	1
Perfluorooctanesulfonic acid (PFOS)	130	H M	3.8	1.0	ng/L		11/10/18 04:47	11/14/18 03:35	1
Perfluorononanoic acid (PFNA)	1.4	U H M	1.9	0.49	ng/L		11/10/18 04:47	11/14/18 03:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	83		50 - 150				11/10/18 04:47	11/14/18 03:35	1
13C4 PFHpA	90		50 - 150				11/10/18 04:47	11/14/18 03:35	1
13C4 PFOA	86		50 - 150				11/10/18 04:47	11/14/18 03:35	1
13C3 PFBS	89		50 - 150				11/10/18 04:47	11/14/18 03:35	1
13C4 PFOS	88		50 - 150				11/10/18 04:47	11/14/18 03:35	1
13C5 PFNA	84		50 - 150				11/10/18 04:47	11/14/18 03:35	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - REDL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	120	H D	9.4	2.2	ng/L		11/10/18 04:47	11/15/18 00:01	5
Perfluorohexanesulfonic acid (PFHxS)	700	H D	9.4	1.8	ng/L		11/10/18 04:47	11/15/18 00:01	5
Perfluoroheptanoic acid (PFHpA)	130	H D	9.4	2.9	ng/L		11/10/18 04:47	11/15/18 00:01	5
Perfluorooctanoic acid (PFOA)	180	H D M	9.4	2.5	ng/L		11/10/18 04:47	11/15/18 00:01	5
Perfluorooctanesulfonic acid (PFOS)	140	H D	19	5.2	ng/L		11/10/18 04:47	11/15/18 00:01	5
Perfluorononanoic acid (PFNA)	100	H D	9.4	2.5	ng/L		11/10/18 04:47	11/15/18 00:01	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	84		50 - 150				11/10/18 04:47	11/15/18 00:01	5
13C4 PFHpA	88		50 - 150				11/10/18 04:47	11/15/18 00:01	5
13C4 PFOA	87		50 - 150				11/10/18 04:47	11/15/18 00:01	5
13C3 PFBS	83		50 - 150				11/10/18 04:47	11/15/18 00:01	5
13C4 PFOS	82		50 - 150				11/10/18 04:47	11/15/18 00:01	5

TestAmerica Sacramento

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW207-03

Date Collected: 10/05/18 19:54

Date Received: 10/09/18 09:30

Lab Sample ID: 320-43995-5

Matrix: Water

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - REDL (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C5 PFNA	84		50 - 150	11/10/18 04:47	11/15/18 00:01	5

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

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW208-01

Lab Sample ID: 320-43995-6

Date Collected: 10/04/18 18:05

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	41	M	1.7	0.38	ng/L		10/18/18 03:14	10/22/18 04:27	1
Perfluorohexanesulfonic acid (PFHxS)	120		1.7	0.32	ng/L		10/18/18 03:14	10/22/18 04:27	1
Perfluoroheptanoic acid (PFHpA)	5.4	M	1.7	0.51	ng/L		10/18/18 03:14	10/22/18 04:27	1
Perfluorooctanoic acid (PFOA)	18	M	1.7	0.45	ng/L		10/18/18 03:14	10/22/18 04:27	1
Perfluorooctanesulfonic acid (PFOS)	370	E	3.3	0.92	ng/L		10/18/18 03:14	10/22/18 04:27	1
Perfluorononanoic acid (PFNA)	1.3	U M	1.7	0.43	ng/L		10/18/18 03:14	10/22/18 04:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	72		50 - 150				10/18/18 03:14	10/22/18 04:27	1
13C4 PFHpA	72		50 - 150				10/18/18 03:14	10/22/18 04:27	1
13C4 PFOA	80		50 - 150				10/18/18 03:14	10/22/18 04:27	1
13C3 PFBS	63		50 - 150				10/18/18 03:14	10/22/18 04:27	1
13C4 PFOS	80		50 - 150				10/18/18 03:14	10/22/18 04:27	1
13C5 PFNA	77		50 - 150				10/18/18 03:14	10/22/18 04:27	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	41	D	8.3	1.9	ng/L		10/18/18 03:14	10/26/18 19:00	5
Perfluorohexanesulfonic acid (PFHxS)	110	D	8.3	1.6	ng/L		10/18/18 03:14	10/26/18 19:00	5
Perfluoroheptanoic acid (PFHpA)	4.7	J D M	8.3	2.5	ng/L		10/18/18 03:14	10/26/18 19:00	5
Perfluorooctanoic acid (PFOA)	18	D M	8.3	2.3	ng/L		10/18/18 03:14	10/26/18 19:00	5
Perfluorooctanesulfonic acid (PFOS)	410	D	17	4.6	ng/L		10/18/18 03:14	10/26/18 19:00	5
Perfluorononanoic acid (PFNA)	6.3	U M	8.3	2.2	ng/L		10/18/18 03:14	10/26/18 19:00	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	66		50 - 150				10/18/18 03:14	10/26/18 19:00	5
13C4 PFHpA	73		50 - 150				10/18/18 03:14	10/26/18 19:00	5
13C4 PFOA	76		50 - 150				10/18/18 03:14	10/26/18 19:00	5
13C3 PFBS	66		50 - 150				10/18/18 03:14	10/26/18 19:00	5
13C4 PFOS	66		50 - 150				10/18/18 03:14	10/26/18 19:00	5
13C5 PFNA	75		50 - 150				10/18/18 03:14	10/26/18 19:00	5

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW210-01

Lab Sample ID: 320-43995-7

Date Collected: 10/04/18 13:47

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	21	M	1.7	0.39	ng/L		10/18/18 03:14	10/22/18 04:35	1
Perfluorohexanesulfonic acid (PFHxS)	60		1.7	0.32	ng/L		10/18/18 03:14	10/22/18 04:35	1
Perfluoroheptanoic acid (PFHpA)	5.3	M	1.7	0.52	ng/L		10/18/18 03:14	10/22/18 04:35	1
Perfluorooctanoic acid (PFOA)	8.6	M	1.7	0.46	ng/L		10/18/18 03:14	10/22/18 04:35	1
Perfluorooctanesulfonic acid (PFOS)	91		3.4	0.94	ng/L		10/18/18 03:14	10/22/18 04:35	1
Perfluorononanoic acid (PFNA)	0.71	J M	1.7	0.44	ng/L		10/18/18 03:14	10/22/18 04:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	64		50 - 150				10/18/18 03:14	10/22/18 04:35	1
13C4 PFHpA	68		50 - 150				10/18/18 03:14	10/22/18 04:35	1
13C4 PFOA	66		50 - 150				10/18/18 03:14	10/22/18 04:35	1
13C3 PFBS	65		50 - 150				10/18/18 03:14	10/22/18 04:35	1
13C4 PFOS	66		50 - 150				10/18/18 03:14	10/22/18 04:35	1
13C5 PFNA	67		50 - 150				10/18/18 03:14	10/22/18 04:35	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW211-01

Lab Sample ID: 320-43995-8

Date Collected: 10/04/18 15:10

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	6.5	M	1.7	0.39	ng/L		10/18/18 03:14	10/22/18 04:42	1
Perfluorohexanesulfonic acid (PFHxS)	21		1.7	0.32	ng/L		10/18/18 03:14	10/22/18 04:42	1
Perfluoroheptanoic acid (PFHpA)	3.2		1.7	0.51	ng/L		10/18/18 03:14	10/22/18 04:42	1
Perfluorooctanoic acid (PFOA)	7.6	M	1.7	0.45	ng/L		10/18/18 03:14	10/22/18 04:42	1
Perfluorooctanesulfonic acid (PFOS)	82		3.4	0.92	ng/L		10/18/18 03:14	10/22/18 04:42	1
Perfluorononanoic acid (PFNA)	0.96	J M	1.7	0.44	ng/L		10/18/18 03:14	10/22/18 04:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	61		50 - 150				10/18/18 03:14	10/22/18 04:42	1
13C4 PFHpA	59		50 - 150				10/18/18 03:14	10/22/18 04:42	1
13C4 PFOA	63		50 - 150				10/18/18 03:14	10/22/18 04:42	1
13C3 PFBS	54		50 - 150				10/18/18 03:14	10/22/18 04:42	1
13C4 PFOS	70		50 - 150				10/18/18 03:14	10/22/18 04:42	1
13C5 PFNA	65		50 - 150				10/18/18 03:14	10/22/18 04:42	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW216-01

Lab Sample ID: 320-43995-9

Date Collected: 10/06/18 09:14

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	U	2500	580	ng/L		10/19/18 10:51	11/07/18 17:36	1
Perfluorohexanesulfonic acid (PFHxS)	530	J M	2500	480	ng/L		10/19/18 10:51	11/07/18 17:36	1
Perfluoroheptanoic acid (PFHpA)	1900	U	2500	760	ng/L		10/19/18 10:51	11/07/18 17:36	1
Perfluorooctanoic acid (PFOA)	1900	U	2500	680	ng/L		10/19/18 10:51	11/07/18 17:36	1
Perfluorooctanesulfonic acid (PFOS)	3800	U	5000	1400	ng/L		10/19/18 10:51	11/07/18 17:36	1
Perfluorononanoic acid (PFNA)	1900	U M	2500	650	ng/L		10/19/18 10:51	11/07/18 17:36	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	94		50 - 150				10/19/18 10:51	11/07/18 17:36	1
13C4 PFHpA	100		50 - 150				10/19/18 10:51	11/07/18 17:36	1
13C4 PFOA	97		50 - 150				10/19/18 10:51	11/07/18 17:36	1
13C3 PFBS	89	M	50 - 150				10/19/18 10:51	11/07/18 17:36	1
13C4 PFOS	94		50 - 150				10/19/18 10:51	11/07/18 17:36	1
13C5 PFNA	95		50 - 150				10/19/18 10:51	11/07/18 17:36	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW216-02

Lab Sample ID: 320-43995-10

Date Collected: 10/06/18 09:16

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	U	2500	580	ng/L		10/19/18 10:51	11/07/18 17:43	1
Perfluorohexanesulfonic acid (PFHxS)	640	J M	2500	480	ng/L		10/19/18 10:51	11/07/18 17:43	1
Perfluoroheptanoic acid (PFHpA)	1900	U	2500	760	ng/L		10/19/18 10:51	11/07/18 17:43	1
Perfluorooctanoic acid (PFOA)	1900	U M	2500	680	ng/L		10/19/18 10:51	11/07/18 17:43	1
Perfluorooctanesulfonic acid (PFOS)	3800	U M	5000	1400	ng/L		10/19/18 10:51	11/07/18 17:43	1
Perfluorononanoic acid (PFNA)	1900	U	2500	650	ng/L		10/19/18 10:51	11/07/18 17:43	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	95		50 - 150				10/19/18 10:51	11/07/18 17:43	1
13C4 PFHpA	103		50 - 150				10/19/18 10:51	11/07/18 17:43	1
13C4 PFOA	103		50 - 150				10/19/18 10:51	11/07/18 17:43	1
13C3 PFBS	94	M	50 - 150				10/19/18 10:51	11/07/18 17:43	1
13C4 PFOS	103		50 - 150				10/19/18 10:51	11/07/18 17:43	1
13C5 PFNA	102		50 - 150				10/19/18 10:51	11/07/18 17:43	1

Client Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-SW201-01

Lab Sample ID: 320-43995-11

Date Collected: 10/06/18 10:12

Matrix: Water

Date Received: 10/09/18 09:30

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1300	U	2500	580	ng/L		10/19/18 10:51	11/07/18 17:51	1
Perfluorohexanesulfonic acid (PFHxS)	1300	U M	2500	480	ng/L		10/19/18 10:51	11/07/18 17:51	1
Perfluoroheptanoic acid (PFHpA)	1900	U	2500	760	ng/L		10/19/18 10:51	11/07/18 17:51	1
Perfluorooctanoic acid (PFOA)	1900	U	2500	680	ng/L		10/19/18 10:51	11/07/18 17:51	1
Perfluorooctanesulfonic acid (PFOS)	3800	U	5000	1400	ng/L		10/19/18 10:51	11/07/18 17:51	1
Perfluorononanoic acid (PFNA)	1900	U	2500	650	ng/L		10/19/18 10:51	11/07/18 17:51	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	88	M	50 - 150	10/19/18 10:51	11/07/18 17:51	1
13C4 PFHpA	93		50 - 150	10/19/18 10:51	11/07/18 17:51	1
13C4 PFOA	96		50 - 150	10/19/18 10:51	11/07/18 17:51	1
13C3 PFBS	88	M	50 - 150	10/19/18 10:51	11/07/18 17:51	1
13C4 PFOS	92		50 - 150	10/19/18 10:51	11/07/18 17:51	1
13C5 PFNA	97		50 - 150	10/19/18 10:51	11/07/18 17:51	1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.95	U H	1.9	0.43	ng/L		11/10/18 04:47	11/14/18 03:43	1
Perfluorohexanesulfonic acid (PFHxS)	1.6	J H M	1.9	0.36	ng/L		11/10/18 04:47	11/14/18 03:43	1
Perfluoroheptanoic acid (PFHpA)	1.4	U H M	1.9	0.58	ng/L		11/10/18 04:47	11/14/18 03:43	1
Perfluorooctanoic acid (PFOA)	1.4	U H M	1.9	0.51	ng/L		11/10/18 04:47	11/14/18 03:43	1
Perfluorooctanesulfonic acid (PFOS)	1.2	J H	3.8	1.0	ng/L		11/10/18 04:47	11/14/18 03:43	1
Perfluorononanoic acid (PFNA)	1.4	U H M	1.9	0.49	ng/L		11/10/18 04:47	11/14/18 03:43	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	82		50 - 150	11/10/18 04:47	11/14/18 03:43	1
13C4 PFHpA	87		50 - 150	11/10/18 04:47	11/14/18 03:43	1
13C4 PFOA	84		50 - 150	11/10/18 04:47	11/14/18 03:43	1
13C3 PFBS	78		50 - 150	11/10/18 04:47	11/14/18 03:43	1
13C4 PFOS	83		50 - 150	11/10/18 04:47	11/14/18 03:43	1
13C5 PFNA	85		50 - 150	11/10/18 04:47	11/14/18 03:43	1

Isotope Dilution Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PFHxS (50-150)	PFHpA (50-150)	PFOA (50-150)	3C3-PFBs (50-150)	PFOS (50-150)	PFNA (50-150)
320-43995-1	FAI18-TW123-01	88	87	91	87	99	94
320-43995-2	FAI18-TW202-01	85	81	87	75	92	89
320-43995-3	FAI18-TW207-01	89	101	101	91 M	95	96
320-43995-4	FAI18-TW207-02	89	89	93	87 M	96	94
320-43995-5	FAI18-TW207-03	89	97	98	94 M	96	95
320-43995-5 - RE	FAI18-TW207-03	83	90	86	89	88	84
320-43995-5 - REDL	FAI18-TW207-03	84	88	87	83	82	84
320-43995-6	FAI18-TW208-01	72	72	80	63	80	77
320-43995-6 - DL	FAI18-TW208-01	66	73	76	66	66	75
320-43995-7	FAI18-TW210-01	64	68	66	65	66	67
320-43995-8	FAI18-TW211-01	61	59	63	54	70	65
320-43995-9	FAI18-TW216-01	94	100	97	89 M	94	95
320-43995-10	FAI18-TW216-02	95	103	103	94 M	103	102
320-43995-11	FAI18-SW201-01	88 M	93	96	88 M	92	97
320-43995-11 - RE	FAI18-SW201-01	82	87	84	78	83	85
LCS 320-253015/2-A	Lab Control Sample	85	93	94	71	96	97
LCS 320-253385/2-A	Lab Control Sample	94	96	98	102	96	95
LCS 320-258300/2-A	Lab Control Sample	85	93	89	87	89	88
LCSD 320-253385/3-A	Lab Control Sample Dup	98	96	99	93	105	98
LCSD 320-258300/3-A	Lab Control Sample Dup	85	89	87	94	92	86
MB 320-253015/1-A	Method Blank	91	84	93	72	86	91
MB 320-253385/1-A	Method Blank	98	96	99	98	98	100
MB 320-258300/1-A	Method Blank	84	87	86	82	88	87

Surrogate Legend

PFHxS = 18O2 PFHxS
PFHpA = 13C4 PFHpA
PFOA = 13C4 PFOA
13C3-PFBS = 13C3 PFBS
PFOS = 13C4 PFOS
PFNA = 13C5 PFNA

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15

Lab Sample ID: MB 320-253015/1-A
Matrix: Water
Analysis Batch: 253903

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 253015

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluorohexanesulfonic acid (PFHxS)	1.0	U	2.0	0.38	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluorooctanoic acid (PFOA)	1.5	U M	2.0	0.54	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U M	4.0	1.1	ng/L		10/18/18 03:14	10/22/18 02:42	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		10/18/18 03:14	10/22/18 02:42	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	91		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C4 PFHpA	84		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C4 PFOA	93		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C3 PFBS	72		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C4 PFOS	86		50 - 150	10/18/18 03:14	10/22/18 02:42	1
13C5 PFNA	91		50 - 150	10/18/18 03:14	10/22/18 02:42	1

Lab Sample ID: LCS 320-253015/2-A
Matrix: Water
Analysis Batch: 253903

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 253015

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	41.4		ng/L		117	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.5		ng/L		100	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	38.4		ng/L		96	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	42.5		ng/L		106	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	37.3		ng/L		100	82 - 112
Perfluorononanoic acid (PFNA)	40.0	39.3		ng/L		98	83 - 113

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	85		50 - 150
13C4 PFHpA	93		50 - 150
13C4 PFOA	94		50 - 150
13C3 PFBS	71		50 - 150
13C4 PFOS	96		50 - 150
13C5 PFNA	97		50 - 150

Lab Sample ID: MB 320-253385/1-A
Matrix: Water
Analysis Batch: 254398

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 253385

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	130	U	250	58	ng/L		10/19/18 10:51	10/24/18 07:59	1
Perfluorohexanesulfonic acid (PFHxS)	130	U M	250	48	ng/L		10/19/18 10:51	10/24/18 07:59	1
Perfluoroheptanoic acid (PFHpA)	190	U	250	76	ng/L		10/19/18 10:51	10/24/18 07:59	1
Perfluorooctanoic acid (PFOA)	190	U M	250	68	ng/L		10/19/18 10:51	10/24/18 07:59	1
Perfluorooctanesulfonic acid (PFOS)	380	U	500	140	ng/L		10/19/18 10:51	10/24/18 07:59	1
Perfluorononanoic acid (PFNA)	190	U M	250	65	ng/L		10/19/18 10:51	10/24/18 07:59	1

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	98		50 - 150	10/19/18 10:51	10/24/18 07:59	1
13C4 PFHpA	96		50 - 150	10/19/18 10:51	10/24/18 07:59	1
13C4 PFOA	99		50 - 150	10/19/18 10:51	10/24/18 07:59	1
13C3 PFBS	98		50 - 150	10/19/18 10:51	10/24/18 07:59	1
13C4 PFOS	98		50 - 150	10/19/18 10:51	10/24/18 07:59	1
13C5 PFNA	100		50 - 150	10/19/18 10:51	10/24/18 07:59	1

Lab Sample ID: LCS 320-253385/2-A
Matrix: Water
Analysis Batch: 254398

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 253385

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanesulfonic acid (PFHxS)	4550	4590		ng/L		101	81 - 106
Perfluoroheptanoic acid (PFHpA)	5000	4840		ng/L		97	80 - 113
Perfluorooctanoic acid (PFOA)	5010	5080		ng/L		102	80 - 107
Perfluorooctanesulfonic acid (PFOS)	4640	4500		ng/L		97	82 - 112
Perfluorononanoic acid (PFNA)	5000	5480		ng/L		110	83 - 113

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	94		50 - 150
13C4 PFHpA	96		50 - 150
13C4 PFOA	98		50 - 150
13C3 PFBS	102		50 - 150
13C4 PFOS	96		50 - 150
13C5 PFNA	95		50 - 150

Lab Sample ID: LCSD 320-253385/3-A
Matrix: Water
Analysis Batch: 257330

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 253385

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Perfluorohexanesulfonic acid (PFHxS)	4550	4400		ng/L		97	81 - 106	4	30
Perfluoroheptanoic acid (PFHpA)	5000	5290		ng/L		106	80 - 113	9	30
Perfluorooctanoic acid (PFOA)	5010	4960		ng/L		99	80 - 107	2	30
Perfluorooctanesulfonic acid (PFOS)	4640	4320		ng/L		93	82 - 112	4	30
Perfluorononanoic acid (PFNA)	5000	5160		ng/L		103	83 - 113	6	30

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
18O2 PFHxS	98		50 - 150
13C4 PFHpA	96		50 - 150
13C4 PFOA	99		50 - 150
13C3 PFBS	93		50 - 150
13C4 PFOS	105		50 - 150
13C5 PFNA	98		50 - 150

QC Sample Results

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: MB 320-258300/1-A
Matrix: Water
Analysis Batch: 259005

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 258300

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.0	U	2.0	0.46	ng/L		11/10/18 04:47	11/14/18 03:13	1
Perfluorohexanesulfonic acid (PFHxS)	0.413	J	2.0	0.38	ng/L		11/10/18 04:47	11/14/18 03:13	1
Perfluoroheptanoic acid (PFHpA)	1.5	U	2.0	0.61	ng/L		11/10/18 04:47	11/14/18 03:13	1
Perfluorooctanoic acid (PFOA)	1.5	U M	2.0	0.54	ng/L		11/10/18 04:47	11/14/18 03:13	1
Perfluorooctanesulfonic acid (PFOS)	3.0	U M	4.0	1.1	ng/L		11/10/18 04:47	11/14/18 03:13	1
Perfluorononanoic acid (PFNA)	1.5	U	2.0	0.52	ng/L		11/10/18 04:47	11/14/18 03:13	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	84		50 - 150	11/10/18 04:47	11/14/18 03:13	1
13C4 PFHpA	87		50 - 150	11/10/18 04:47	11/14/18 03:13	1
13C4 PFOA	86		50 - 150	11/10/18 04:47	11/14/18 03:13	1
13C3 PFBS	82		50 - 150	11/10/18 04:47	11/14/18 03:13	1
13C4 PFOS	88		50 - 150	11/10/18 04:47	11/14/18 03:13	1
13C5 PFNA	87		50 - 150	11/10/18 04:47	11/14/18 03:13	1

Lab Sample ID: LCS 320-258300/2-A
Matrix: Water
Analysis Batch: 259005

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 258300

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	33.5		ng/L		95	87 - 120
Perfluorohexanesulfonic acid (PFHxS)	36.4	30.8		ng/L		85	81 - 106
Perfluoroheptanoic acid (PFHpA)	40.0	36.2		ng/L		91	80 - 113
Perfluorooctanoic acid (PFOA)	40.0	39.2		ng/L		98	80 - 107
Perfluorooctanesulfonic acid (PFOS)	37.1	33.5		ng/L		90	82 - 112
Perfluorononanoic acid (PFNA)	40.0	36.4		ng/L		91	83 - 113

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	85		50 - 150
13C4 PFHpA	93		50 - 150
13C4 PFOA	89		50 - 150
13C3 PFBS	87		50 - 150
13C4 PFOS	89		50 - 150
13C5 PFNA	88		50 - 150

Lab Sample ID: LCSD 320-258300/3-A
Matrix: Water
Analysis Batch: 259005

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 258300

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	31.7		ng/L		90	87 - 120	5	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	31.5		ng/L		87	81 - 106	2	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.1		ng/L		95	80 - 113	5	30
Perfluorooctanoic acid (PFOA)	40.0	39.0		ng/L		97	80 - 107	0	30

TestAmerica Sacramento

QC Sample Results

Client: R&M Consultants, Inc
 Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Method: EPA 537 (Mod) - PFAS for QSM 5.1, Table B-15 (Continued)

Lab Sample ID: LCSD 320-258300/3-A
 Matrix: Water
 Analysis Batch: 259005

Client Sample ID: Lab Control Sample Dup
 Prep Type: Total/NA
 Prep Batch: 258300

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	37.1	31.2	M	ng/L		84	82 - 112	7	30
Perfluorononanoic acid (PFNA)	40.0	38.9		ng/L		97	83 - 113	7	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
18O2 PFHxS	85		50 - 150
13C4 PFHpA	89		50 - 150
13C4 PFOA	87		50 - 150
13C3 PFBS	94		50 - 150
13C4 PFOS	92		50 - 150
13C5 PFNA	86		50 - 150

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

LCMS

Prep Batch: 253015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-1	FAI18-TW123-01	Total/NA	Water	3535	
320-43995-2	FAI18-TW202-01	Total/NA	Water	3535	
320-43995-6 - DL	FAI18-TW208-01	Total/NA	Water	3535	
320-43995-6	FAI18-TW208-01	Total/NA	Water	3535	
320-43995-7	FAI18-TW210-01	Total/NA	Water	3535	
320-43995-8	FAI18-TW211-01	Total/NA	Water	3535	
MB 320-253015/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-253015/2-A	Lab Control Sample	Total/NA	Water	3535	

Prep Batch: 253385

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-3	FAI18-TW207-01	Total/NA	Water	3535	
320-43995-4	FAI18-TW207-02	Total/NA	Water	3535	
320-43995-5	FAI18-TW207-03	Total/NA	Water	3535	
320-43995-9	FAI18-TW216-01	Total/NA	Water	3535	
320-43995-10	FAI18-TW216-02	Total/NA	Water	3535	
320-43995-11	FAI18-SW201-01	Total/NA	Water	3535	
MB 320-253385/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-253385/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-253385/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 253903

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-1	FAI18-TW123-01	Total/NA	Water	EPA 537 (Mod)	253015
320-43995-2	FAI18-TW202-01	Total/NA	Water	EPA 537 (Mod)	253015
320-43995-6	FAI18-TW208-01	Total/NA	Water	EPA 537 (Mod)	253015
320-43995-7	FAI18-TW210-01	Total/NA	Water	EPA 537 (Mod)	253015
320-43995-8	FAI18-TW211-01	Total/NA	Water	EPA 537 (Mod)	253015
MB 320-253015/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	253015
LCS 320-253015/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	253015

Analysis Batch: 254398

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-253385/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	253385
LCS 320-253385/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	253385

Analysis Batch: 255236

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-6 - DL	FAI18-TW208-01	Total/NA	Water	EPA 537 (Mod)	253015

Analysis Batch: 257330

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 320-253385/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	253385

Analysis Batch: 257629

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-3	FAI18-TW207-01	Total/NA	Water	EPA 537 (Mod)	253385
320-43995-4	FAI18-TW207-02	Total/NA	Water	EPA 537 (Mod)	253385
320-43995-5	FAI18-TW207-03	Total/NA	Water	EPA 537 (Mod)	253385
320-43995-9	FAI18-TW216-01	Total/NA	Water	EPA 537 (Mod)	253385
320-43995-10	FAI18-TW216-02	Total/NA	Water	EPA 537 (Mod)	253385

TestAmerica Sacramento

QC Association Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

LCMS (Continued)

Analysis Batch: 257629 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-11	FAI18-SW201-01	Total/NA	Water	EPA 537 (Mod)	253385

Prep Batch: 258300

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-5 - RE	FAI18-TW207-03	Total/NA	Water	3535	
320-43995-5 - REDL	FAI18-TW207-03	Total/NA	Water	3535	
320-43995-11 - RE	FAI18-SW201-01	Total/NA	Water	3535	
MB 320-258300/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-258300/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-258300/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 259005

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-5 - RE	FAI18-TW207-03	Total/NA	Water	EPA 537 (Mod)	258300
320-43995-11 - RE	FAI18-SW201-01	Total/NA	Water	EPA 537 (Mod)	258300
MB 320-258300/1-A	Method Blank	Total/NA	Water	EPA 537 (Mod)	258300
LCS 320-258300/2-A	Lab Control Sample	Total/NA	Water	EPA 537 (Mod)	258300
LCSD 320-258300/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537 (Mod)	258300

Analysis Batch: 259226

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43995-5 - REDL	FAI18-TW207-03	Total/NA	Water	EPA 537 (Mod)	258300

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW123-01

Lab Sample ID: 320-43995-1

Date Collected: 10/04/18 11:10

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			295.4 mL	10.00 mL	253015	10/18/18 03:14	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			253903	10/22/18 04:12	S1M	TAL SAC

Client Sample ID: FAI18-TW202-01

Lab Sample ID: 320-43995-2

Date Collected: 10/04/18 12:33

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			292.3 mL	10.00 mL	253015	10/18/18 03:14	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			253903	10/22/18 04:20	S1M	TAL SAC

Client Sample ID: FAI18-TW207-01

Lab Sample ID: 320-43995-3

Date Collected: 10/05/18 19:52

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			0.2 mL	10.00 mL	253385	10/19/18 10:51	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			257629	11/07/18 17:13	S1M	TAL SAC

Client Sample ID: FAI18-TW207-02

Lab Sample ID: 320-43995-4

Date Collected: 10/05/18 18:55

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			0.2 mL	10.00 mL	253385	10/19/18 10:51	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			257629	11/07/18 17:21	S1M	TAL SAC

Client Sample ID: FAI18-TW207-03

Lab Sample ID: 320-43995-5

Date Collected: 10/05/18 19:54

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	RE		265 mL	10.00 mL	258300	11/10/18 04:47	MYV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	RE	1			259005	11/14/18 03:35	JRB	TAL SAC
Total/NA	Prep	3535			0.2 mL	10.00 mL	253385	10/19/18 10:51	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			257629	11/07/18 17:28	S1M	TAL SAC
Total/NA	Prep	3535	REDL		265 mL	10.00 mL	258300	11/10/18 04:47	MYV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	REDL	5			259226	11/15/18 00:01	JRB	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-TW208-01

Lab Sample ID: 320-43995-6

Date Collected: 10/04/18 18:05

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			299.6 mL	10.00 mL	253015	10/18/18 03:14	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			253903	10/22/18 04:27	S1M	TAL SAC
Total/NA	Prep	3535	DL		299.6 mL	10.00 mL	253015	10/18/18 03:14	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)	DL	5			255236	10/26/18 19:00	S1M	TAL SAC

Client Sample ID: FAI18-TW210-01

Lab Sample ID: 320-43995-7

Date Collected: 10/04/18 13:47

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			293.8 mL	10.00 mL	253015	10/18/18 03:14	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			253903	10/22/18 04:35	S1M	TAL SAC

Client Sample ID: FAI18-TW211-01

Lab Sample ID: 320-43995-8

Date Collected: 10/04/18 15:10

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			297.6 mL	10.00 mL	253015	10/18/18 03:14	MNV	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			253903	10/22/18 04:42	S1M	TAL SAC

Client Sample ID: FAI18-TW216-01

Lab Sample ID: 320-43995-9

Date Collected: 10/06/18 09:14

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			0.2 mL	10.00 mL	253385	10/19/18 10:51	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			257629	11/07/18 17:36	S1M	TAL SAC

Client Sample ID: FAI18-TW216-02

Lab Sample ID: 320-43995-10

Date Collected: 10/06/18 09:16

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			0.2 mL	10.00 mL	253385	10/19/18 10:51	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			257629	11/07/18 17:43	S1M	TAL SAC

Client Sample ID: FAI18-SW201-01

Lab Sample ID: 320-43995-11

Date Collected: 10/06/18 10:12

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	RE		264.4 mL	10.00 mL	258300	11/10/18 04:47	MYV	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Client Sample ID: FAI18-SW201-01

Lab Sample ID: 320-43995-11

Date Collected: 10/06/18 10:12

Matrix: Water

Date Received: 10/09/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 537 (Mod)	RE	1			259005	11/14/18 03:43	JRB	TAL SAC
Total/NA	Prep	3535			0.2 mL	10.00 mL	253385	10/19/18 10:51	TWL	TAL SAC
Total/NA	Analysis	EPA 537 (Mod)		1			257629	11/07/18 17:51	S1M	TAL SAC

Laboratory References:

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

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Accreditation/Certification Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-19

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Method Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod) 3535	PFAS for QSM 5.1, Table B-15 Solid-Phase Extraction (SPE)	DOD 5.1 SW846	TAL SAC TAL SAC

Protocol References:

DOD 5.1 = Department of Defense Quality Systems Manual V5.1

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Sample Summary

Client: R&M Consultants, Inc
Project/Site: FAI PFAS

TestAmerica Job ID: 320-43995-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-43995-1	FAI18-TW123-01	Water	10/04/18 11:10	10/09/18 09:30
320-43995-2	FAI18-TW202-01	Water	10/04/18 12:33	10/09/18 09:30
320-43995-3	FAI18-TW207-01	Water	10/05/18 19:52	10/09/18 09:30
320-43995-4	FAI18-TW207-02	Water	10/05/18 18:55	10/09/18 09:30
320-43995-5	FAI18-TW207-03	Water	10/05/18 19:54	10/09/18 09:30
320-43995-6	FAI18-TW208-01	Water	10/04/18 18:05	10/09/18 09:30
320-43995-7	FAI18-TW210-01	Water	10/04/18 13:47	10/09/18 09:30
320-43995-8	FAI18-TW211-01	Water	10/04/18 15:10	10/09/18 09:30
320-43995-9	FAI18-TW216-01	Water	10/06/18 09:14	10/09/18 09:30
320-43995-10	FAI18-TW216-02	Water	10/06/18 09:16	10/09/18 09:30
320-43995-11	FAI18-SW201-01	Water	10/06/18 10:12	10/09/18 09:30

WORK ORDER # _____ CLIENT: Rawl M Consultants PROJECT: FAI PFAS

Date/Time Cooler Arrived 10/18/18 9:45 Cooler signed for by: Andrew Pilch
(Print name)

Preliminary Examination Phase:

Date cooler opened: same as date received or / / Cooler ID: AP 10/18/18
~~Chromium~~ Cadmium

Cooler opened by (print) Andrew Pilch (sign) _____

1. Delivered by ALASKA AIRLINES Fed-Ex UPS NAC LYNDEN CLIENT Other: _____
Shipment Tracking # if applicable _____ (include copy of shipping papers in file)

2. Number of Custody Seals 2 Signed by _____ Date / /

Were custody seals unbroken and intact on arrival? Yes No

3. Were custody papers sealed in a plastic bag? Yes No

4. Were custody papers filled out properly (ink, signed, etc.)? Yes No

5. Did you sign the custody papers in the appropriate place? Yes No

6. Was ice used? Yes No Type of ice: blue ice gel ice real ice dry ice Condition of Ice: hard

Temperature: Blank 1.9 °C (corrected) Cooler _____ °C (corrected) Thermometer # Rec #5

7. Packing in Cooler: bubble wrap Styrofoam cardboard Other: _____

8. Did samples arrive in plastic bags? Yes No

9. Did all bottles arrive unbroken, and with labels in good condition? Yes No

10. Are all bottle labels complete (ID, date, time, etc.) Yes No

11. Do bottle labels and Chain of Custody agree? Yes No

12. Are the containers and preservatives correct for the tests indicated? Yes No

13. Is there adequate volume for the tests requested? Yes No

14. Are there dry weight containers provided? Yes No N/A

15. Were VOA vials free of bubbles? Yes No N/A

If "NO" which containers contained "head space" or bubbles? _____

16. Are methanol soils immersed in methanol? Yes No N/A

Log-in Phase:

Date of sample log-in / /

Samples logged in by (print) _____ (sign) _____

1. Was project, bid or quote identifiable from custody papers? Yes No

2. Do Turn Around Times and Due Dates agree? Yes No

3. Was the Project Manager notified of any RUSH status? Yes No

4. Was the Lab notified of RUSH or short hold status? Yes No

5. Was the COC scanned and copied? Yes No

Login Sample Receipt Checklist

Client: R&M Consultants, Inc

Job Number: 320-43995-1

Login Number: 43995
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Did cooler come with a shipping slip (air bill, etc.)?	True	
If YES, enter carrier name and airbill number.	True	PO Fedex / 773421756473
Were custody seals on outside of cooler?	True	
How many & where?	True	1 front
Seal Date/Seal Name	True	seal - 10/8/18
Were custody seals unbroken and intact at the date and time of arrival?	True	
Were samples screened for radioactivity using the Geiger counter?	N/A	
Were custody papers in a plastic bag & taped inside to the lid?	True	
Were custody papers filled out properly (ink, signed , etc.)?	True	
Were custody papers signed in the appropriate place?	True	
Was the project identifiable from the custody papers?	True	
If YES, enter project name.	True	FAI PFAS
Were temperature blanks used?	True	
Cooler Temperature(s)/Thermometer ID No.	True	5.2C / AK-5
Initials of designated person to acknowledge receipt of cooler.	True	MG
Describe type of packing in cooler	True	Bubble Wrap
Were all bottles sealed in separate plastic bags?	True	
Did all bottles arrive unbroken with labels in good condition?	True	
Were all bottle labels complete (ID, date, time, signature, preservative, etc.)?	True	
Did all bottle labels agree with custody papers?	True	
Were correct containers used for the tests indicated?	True	
Were samples preserved to correct pH, if applicable?	True	
Was a sufficient amount of sample sent for tests indicated?	True	
Were bubbles absent in the volatile organic analysis (VOA) samples?	True	
If NO, list VOA samples.	True	
Was the Project Manager called and status discussed?	N/A	
Who was called? By Whom?	True	



APPENDIX J
WORK PLAN CHANGE DOCUMENTATION

Chris Fell

From: Burgess, Robert A (DEC) <robert.burgess@alaska.gov>
Sent: Wednesday, July 25, 2018 4:54 PM
To: Chris Fell
Cc: Kristi McLean; Spear, Angela M (DOT); Jaramillo, Ashley M (DOT)
Subject: RE: Addendum to the PFAS Groundwater Characterization Plan (File Number 100.38.277): Phased Investigation Change

Hello Chris.

The DEC approves of the proposed changes outlined in your email below. Please continue to keep me informed of any project schedule changes.

As discussed over the phone, please include this email as an attachment to the report, and please document this and other changes to the original workplan under a “deviations” section in the report.

Thank you,
Robert

Robert A. Burgess
Environmental Program Specialist IV
Alaska Department of Environmental Conservation
Contaminated Sites Program
(907)451-2153

From: Chris Fell [mailto:CFell@rmconsult.com]
Sent: Wednesday, July 25, 2018 4:07 PM
To: Burgess, Robert A (DEC) <robert.burgess@alaska.gov>
Cc: Kristi McLean <KMclean@rmconsult.com>; Spear, Angela M (DOT) <angie.spear@alaska.gov>; Jaramillo, Ashley M (DOT) <ashley.jaramillo@alaska.gov>
Subject: Addendum to the PFAS Groundwater Characterization Plan (File Number 100.38.277): Phased Investigation Change

Good Afternoon Robert,

As discussed on the phone, we propose to alter the phased investigation approach as outlined below:

Test America has a significant sample backlog right now that is projected to continue for the rest of the year and will not be able to provide rush turnaround times. The standard turnaround time is currently extended to 20 days. This will impact our phased investigation approach as follows:

- Drill Phase I locations as planned.
- Demobilize and wait for chemical data from Test America (Approx. 20 days).
- Combine Phase II and III into a single Phase and select locations.
- Re-mobilize the drill rig and drill combined Phase II/III locations.

This approach alteration maintains our ability to make decisions on Phase II locations after getting Phase I data. Phase III was only 5 locations, and moving those 5 locations into an expanded Phase II is of minimal impact.

Our field schedule is starting to take shape and is tentatively outlined below:

FAA asked us to push back the start of drilling to no earlier than (NET) 8/13 as they are going to be more thorough with locates given Eielson's Red Flag exercises and multiple recent communication line cuts by other contractors.

- Phase I Start (NET 8/13)
- Combined Phase II/III Start (NET 9/13)

Please let us know if you have any questions or comments about our proposed changes to the investigation phases. This e-mail will serve as an addendum to the approved work plan and will be included with the report as documentation.

Regards,

Christopher D. Fell, CPG *Senior Geologist*

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907.646.9655 direct | 907.229.1617 mobile

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Innovating Today for Alaska's Tomorrow



Work Plan Change #2

To: Robert Burgess, Alaska Department of Environmental Conservations

From: Christopher Fell, CPG

Subject: Investigation Location Changes – Utility Locating and Access Considerations

Date: 8/2/2018

Project #: 2393.03

Dear Mr. Burgess,

Field staking of the investigations locations for the approved PFAS Groundwater Characterization Plan dated 4 June 2018 (Work Plan) resulted in the alteration of 26 and deletion of 4 proposed locations.

Locations were primarily moved to avoid potential or perceived private property conflicts, obvious utility conflicts, or to prevent impacts to residents during drilling. The 4 locations deleted were solely from Phase II or Phase III and resulted from access issues. The table included on page 2 provides a detailed list of the altered and deleted locations along with reasoning for the change and the presumed effect the change may have on the investigation. The attached map provides a visual representation of the changes.

This memorandum will be added to the field copy of the Work Plan and will be officially documented by including it in the investigation report that will be prepared following investigation. If you agree with the changes described herein, please sign and return this Work Plan Change Form. If you have comments or questions please contact us for resolution and we will revise this document accordingly.

R&M CONSULTANTS, INC

Christopher D. Fell
2018.08.02
08:33:35 -08'00'

Christopher D. Fell, CPG
Senior Geologist
Qualified Environmental Professional

ADEC APPROVAL

Digitally signed by
Robert Burgess
Date: 2018.08.02
16:13:01 -08'00'

Robert A. Burgess
Environmental Program Specialist IV
ADEC Project Manager

Summary of Investigation Location Changes

Name	Distance Moved (ft)	Reason	Effect on Investigation Goals
TW102a	33	New fence	None
TW103a	54	Railroad tracks	None
TW108a	56	Move off tenant lot	None
TW110a	36	Avoid storm drains	None
TW111a	119	Water line and driveway entrance	None
TW113a	308	Slopes, traffic	None
TW114a	344	Private road	Slightly less optimal location, adequate for the large scale resolution of this investigation.
TW115a	49	Natural opening in woods	None
TW117a	28	Water and sewer lines	None
TW118a	41	Safety (visibility to traffic)	None
TW122a/TH101	176	Fence, dense trees	None
TW123a	436	Fence, dense trees	None
TW124a/TH104	168	Dense trees, fence	None
TW126a	1230	Airport Tenant Concern	None
TW128a	126	Avoid Airport Way and need for traffic control	None
TW129a	123	Dense trees, swampy ground	None, new location still test groundwater between the two planned surface water locations and is actually closer to the drinking water well
TW201a	233	Runway exclusion zone	None
TW206a	118	Fence, railroad tracks	None
TW208a	25	Waterline	None
TW209a	107	Tourism business parking	None
TW210a	29	Water line	None
TW214a	56	Steep slope	None
TW215a	86	Fence, dense trees	None
TW218a	84	Driveway entrance	None
TW304a	41	Gas line	None
TW306a	83	Private Driveway	None expected, Dependent on Phase I results
TW220	Deleted	No access without heavy clearing, standing water	None expected, Dependent on Phase I results
TW205	Deleted	No access, swamp, lots of brush.	None expected, Dependent on Phase I results
TW305	Deleted	No access, swamp, lots of brush.	None expected, Dependent on Phase I results
TW213	Deleted	Difficult access, Traffic control on Mitchel Expressway required.	None expected, Dependent on Phase I results

1. This map is based on the final PFS Groundwater Characterization Plan (Work Plan) prepared by R&M Consultants, Inc. dated 4 June 2018.
 2. Existing data were provided by others and more current data for drinking water wells are likely available.
 3. This map was prepared on metrics only.

APPROXIMATE SCALE IN FEET
 0 100 200 400 800 1600 2400



2018 Investigation Legend

AFFF Phase of Use (Identifies Work Plan) (Pink)
 Source Area (Purple)
 Building Structure (Grey)
 F&I Boundary (Red)
 Proposed Surface Water Sampling Locations (Blue)
 Phase I Sample (Green)
 Phase I Test Hole (Blue)
 Phase II Test Hole Sampling Locations (Red)
 Staged and Proposed TW Well Locations (Blue)
 Locations (Blue)

Staged and Proposed TW Well Locations
 Phase I TMW, Proposed (Blue circle)
 Phase I TMW, Staged (Blue circle with red border)
 Phase II TMW, Proposed (Red circle)
 Phase II TMW, Staged (Red circle with blue border)
 Phase III TMW, Proposed (Green circle)
 Phase III TMW, Staged (Green circle with blue border)
 Staged Well (Blue circle with red border)
 Proposed Well (Blue circle with green border)
 Debris (X)
 Proposed Surface Water Sampling Locations (Blue circle with blue border)
 Locations (Blue circle with blue border)
 Elevation Only (Blue circle with blue border)
 Wellcap Sampling Only (Blue circle with blue border)
 Bath Types (Blue circle with blue border)
 Existing Monitoring Well Sampling Locations (Blue circle with blue border)
 Phase I Sample (Blue circle with blue border)

Existing Data Legend

Groundwater Sampling (PROMFOS Highest Concentration)
 0 to 64.9 ng/L (Green circle)
 65.0 to 399 ng/L (Yellow circle)
 Greater than 400 ng/L (Exceeds AEC Groundwater Cleanup Level) (Red circle)
Surface Water Sampling (PROMFOS Highest Concentration)
 ND to 64.9 ng/L (Green triangle)
 65.0 to 399 ng/L (Yellow triangle)
 Greater than 400 ng/L (Exceeds AEC Groundwater Cleanup Level) (Red triangle)
Drinking Water Well Sampling (LUM 4)
 0 to 34.9 ng/L (Green circle)
 35.0 to 64.9 ng/L (Yellow circle)
 Greater than 65.0 ng/L (Exceeds EPA Drinking Water MCL of 2.0 mg/L) (Red circle)
 Pending Results (as of 2/10/2018) (Blue circle)

\s\GIS\2018 INVESTIGATION\2018 INVESTIGATION LOCATIONS MAP\2018 INVESTIGATION LOCATIONS MAP.aprx