



*Original and Former
Fire Training Facilities
Fourth Quarter 2019 Groundwater
Monitoring Report
Portland International Airport
Portland, Oregon
ECSI No. 3324*

Prepared for:
Port of Portland

January 15, 2020
1264-06



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A handwritten signature in black ink that reads 'Heather Gosack'.

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1/15/20

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Executive Summary

At the request of the Port of Portland (Port), Apex Companies, LLC (Apex) prepared this *Fourth Quarter 2019 Groundwater Monitoring Report* (the Report) presenting a summary of field activities and chemical analysis of groundwater, stormwater, and surface water samples collected during the reporting period in the vicinity of, or potentially impacted by, the Original and Former fire training facilities (Original and Former Facilities; the Site) at Portland International Airport (PDX; Figures 1 and 2). Investigation and monitoring activities are being conducted with oversight from the Oregon Department of Environmental Quality (DEQ) in accordance with the Voluntary Cleanup Agreement (VCP) between the DEQ and the Port of Portland for ECSI No. 3324, dated February 8, 2017. The purpose of the investigation and monitoring is to delineate impacts associated with fire training activities conducted at the Site. Groundwater, stormwater, and surface water sampling is being conducted in accordance with the *Additional Investigation Work Plan Addendum* dated November 20, 2018.

The Original and Former Fire Training Facilities are located in the northwest portion of PDX and have been actively used for aviation firefighting drills since 1963. It is our understanding that the Original Facility was used from approximately 1963 until the early to mid-1970s, after which the Former Facility was utilized for training exercises until 1989, when the current fire training facility was constructed in the same area. Several historical investigations and cleanup actions have been conducted at the Site, including soil excavation and the construction of a protective cap to prevent contact with separate-phase hydrocarbons (SPH) and soil with chemical concentrations that are above human health exposure limits.

At the request of the DEQ, reconnaissance groundwater monitoring was conducted in April 2017 using existing monitoring wells to update current Site conditions, to confirm that concentrations of previously identified hydrocarbons and volatile organic compounds (VOCs) are below relevant Screening Level Values (SLVs), and to assess if other constituents, including certain per- and polyfluorinated alkyl substances (PFAS; a component of aqueous film forming foam [AFFF]), were present (Apex, 2017a). Results of the April 2017 groundwater monitoring indicated that shallow (Overbank Deposit [OD]) groundwater at the Original and Former Fire Training Facilities was impacted by PFAS, specifically, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), above the U.S. Environmental Protection Agency (EPA) Health Advisory (HA) limit of 70 nanograms per liter (ng/L; combined PFOA and PFOS). A deeper groundwater sample was also collected from the Upper Columbia River Sand Aquifer (CRSA) during the April 2017 investigation from the new PDX Rental Car Quick Turnaround (QTA) Facility well screened from 145 to 200 feet below ground surface (bgs). PFAS compounds were not detected in this sample (Apex 2017b).

A Preliminary Assessment (PA; Apex, 2017c) was prepared for the Port in August 2017 to identify the current and historical uses of AFFF at PDX, including those that may have been operated by parties other than the Port. Several areas of interest (AOIs) were identified and associated with current or historical AFFF use, including the current and former PDX fire training facilities, the ground area west of the former fire training facility where reclaimed water was land applied, former and current PDX fire stations, Oregon Air National

Guard (OANG) current and former leased facilities, and the former PAMCOR Hangar (currently leased by Boeing). The PA identified the fire training facilities and the fire station AOIs as the highest priority for environmental investigation based on the historical use of AFFF, the frequency and volume of AFFF used during fire training exercises, historical storage and disposal practices, and known releases to the environment.

Based on results from the April 2017 groundwater monitoring and information from the completed PA, additional investigation activities were completed in August and September 2017 and from May through July 2018 to delineate the extent of PFAS in the vicinity of the Original and Former Fire Training Facilities. In addition, available screening levels for PFAS were reviewed for U.S. states and other countries during the investigation activities conducted in 2017 and 2018. There are no applicable DEQ screening levels for PFAS in groundwater, stormwater, surface water, sediment, or soil; therefore, screening levels developed by EPA, as well as levels developed by Texas, Michigan, and Maine, were used throughout this investigation. The *Revised Investigation Results Report* dated January 31, 2018 (Apex, 2018a) documented the potential Site receptors and exposure pathways that were identified and screening levels that had been developed by the EPA, other U.S. states, and countries globally. The screening values were evaluated and selected based on receptor and pathway. Additional information regarding the selected screening levels is provided within Section 2.5 of this report.

During the September 2017 investigation, PFAS in groundwater samples were detected at concentrations above the EPA HA level to the north, south, and east of the fire training facilities. Additionally, collected soil samples contained concentrations of PFAS compounds that were above selected protection of residential drinking water screening levels; however, concentrations were below the selected residential direct contact screening levels. PFAS compounds were detected at concentrations that were above the laboratory method reporting limit in stormwater and surface water samples collected in the vicinity of the Site, and at concentrations exceeding the selected human health screening levels; however, PFAS concentrations detected in surface water samples collected from drainage ditches downstream of the Site were below the selected screening values. Detected concentrations in surface water samples were compared to the Maine recreational screening values for qualitative purposes only, as the off-Site ditches are not used recreationally. For sediment samples collected downstream of outfall OF1N, PFAS compounds were not detected at concentrations above the laboratory method reporting limit.

During the 2018 investigation, concentrations of PFAS were detected in groundwater below EPA HA level to the north, northeast, east (including the former fire station area), southeast, and south of the current Fire Training Facilities. PFAS compounds were detected at concentrations above the laboratory method reporting limit in stormwater and surface water samples, but below the selected screening values. Deep groundwater (Upper CRSA) monitoring wells were installed, and the results of groundwater samples collected indicated concentrations below the EPA HA with the exception of one well with a detected concentration slightly above the HA at 87.4 ng/L. PFAS compounds were not detected above laboratory method reporting limits in

analyzed soil samples. During the 2018 investigation, groundwater samples were also obtained from two Port-owned irrigation wells screened below 150 feet below grade and located in the City of Portland's Columbia South Shore Well Field. PFAS compounds were not detected in the two Port-owned irrigation wells above the method reporting limits.

In January and February 2019, a total of 19 OD monitoring wells were installed, developed, and sampled. Monitoring wells were installed to expand the monitoring well network to address data gaps in defining the nature and extent of PFAS in groundwater at the Site. The wells were developed following installation to establish a connection with the shallow aquifer. Groundwater gradient and flow at the Site was observed to the north-northwest and will continue to be evaluated as additional data are obtained during the monthly monitoring and quarterly sampling events.

Based on the results of the of quarterly groundwater sampling events conducted during Calendar Year (CY) 2019 (first through fourth quarter 2019), PFAS in shallow groundwater were detected above the EPA HA primarily within the area of the former fire training facilities. Concentrations of PFAS fluctuate in response to the water table elevation but are generally stable. Stormwater and surface water sampling during CY 2019 has detected PFAS in surface water generally below the construction worker and aquatic organisms SLVs with the exception of the third quarter result of PFOA at SW-2. Concentrations of PFOA and PFOS have been detected above the SLVs in stormwater during two quarters. Based on the results of the monitoring to date, the need for additional shallow groundwater (OD), deeper groundwater (CRSA) and surface water monitoring points will be assessed.

1.0 Introduction

This *Fourth Quarter 2019 Groundwater Monitoring Report* (the Report) presents a summary of field activities and chemical analysis of groundwater, stormwater, and surface water samples collected during the reporting period in the vicinity of, or potentially impacted by, the Original and Former fire training facilities (Original and Former Facilities; the Site) at Portland International Airport (PDX; Figures 1 and 2). Work at the Site is being conducted with oversight from the Oregon Department of Environmental Quality (DEQ) in accordance with the Voluntary Cleanup Agreement (VCP) between the DEQ and the Port of Portland (Port) for ECSI No. 3324, dated February 8, 2017. Groundwater, surface water, and stormwater sampling is being conducted in accordance with the *Additional Investigation Work Plan Addendum* submitted to DEQ on November 20, 2018 (Apex, 2018b).

1.1 Purpose

The purpose of the sampling described in this report was to address several data gaps identified during investigation activities conducted in 2017 and 2018, including the following.

- **Overbank Deposit (OD) Groundwater.** In general, polyfluorinated alkyl substances (PFAS; a component of aqueous film forming foam [AFFF]) concentrations in shallow (OD) groundwater are well-delineated to the U.S. Environmental Protection Agency (EPA) Health Advisory (HA) level to the north, northeast, east (including the former fire station area), southeast, and south of the current Fire Training Facilities. Additional shallow groundwater delineation was needed to the northwest, west, and southwest. The installation of the OD monitoring well network and subsequent groundwater monitoring provides data to aid in the delineation of the remaining impacts and assess concentration trends.
- **Upper Columbia River Sand Aquifer (CRSA) Groundwater Monitoring.** With the exception of one monitoring well result from the July 2018 sampling event, PFAS concentrations in Upper Columbia River Sand Aquifer (CRSA) monitoring wells installed in June 2018 were below the EPA HA.
- **Stormwater and Surface Water.** Stormwater and surface water within the vicinity of and downgradient of the impacted areas contains PFAS concentrations that exceed selected screening level values (SLVs) for construction workers. DEQ requested additional stormwater and surface water sampling to better understand the varying concentrations and movement of PFAS originating from the Original and Former Fire Training Facilities.

1.2 Scope of Work

The field activities and sample analysis conducted during this reporting period included the following tasks.

- Implementation of the current groundwater monitoring program for Site monitoring wells (Table 1 and Figure 2). The monitoring program includes monthly gauging of groundwater levels from Site wells; quarterly collection of groundwater samples for analysis of PFAS from select OD monitoring wells

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- and three Upper CRSA wells; and preparation of a quarterly report. Collected groundwater samples were analyzed for 24 PFAS compounds as identified by the EPA.
- Collection of stormwater and surface water samples at select locations downgradient of the Original and Former Fire Training Facilities. Locations sampled included the outfall downgradient of the fire training facilities (OFN-1NW), and two locations downstream of the outfall at the western extent of the Port property (SW-2) and in a Multnomah County Drainage District (MCDD) drainage ditch prior to being pumped into the Columbia Slough (SW-3) to assess seasonal variations of PFAS concentrations in surface water downgradient of the Site. Stormwater and surface water samples were analyzed for the 24 PFAS compounds.

2.0 Background

This section presents a brief description of the Site, its history, and available physical and chemical data. Information included in this section was obtained from previously completed site investigations and related work conducted within the vicinity of the Site.

2.1 Site Location and Description

The Site is located in the northwest portion of PDX (shown on Figures 1 and 2). Portions of the Site have been actively used for aviation firefighting drills since 1963. It is our understanding that the Original Facility was used from approximately 1963 until the early to mid-1970s, after which the Former Facility was utilized for training exercises until 1989. The Current Facility has been used since approximately 1989.

Fire training exercises utilized water and retardant firefighting foams (i.e. AFFF) to extinguish training fires and during training activities at the Site. The EPA has established drinking water health advisories for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) based on the agency's assessment of the latest peer-reviewed science on their potential human health effects. The Current Facility is lined to reduce the introduction of chemicals to the subsurface; however, the Original and Former Facilities are not lined, and were not lined during the historical training exercises.

Two former fire stations were located in the northwest portion of PDX (Figures 1 and 2). The first fire station was in operation from 1960 to 1972. The second station was located southwest of the original and was in operation from 1972 to 1997. Historical activities included firetruck and equipment storage and, presumably, AFFF and other fire-fighting chemical storage. The current fire training facility was developed in 1990 and is located east of the former training facilities.

PDX and its fire department are regulated under the Federal Aviation Administration (FAA) and the National Fire Protection Association (NFPA) regulations and guidance which specify the AFFF type, testing, use, and training that is required for use of AFFF on commercial aviation facilities. The PDX fire department has

followed these regulations and standards of practice which has resulted in the use of PFAS-containing AFFF since their introduction in late 1960s.

2.2 Site History

Several historical investigations and remedial actions have been conducted at the Site, including soil excavation and the construction of a protective cap to prevent contact with separate-phase hydrocarbons (SPHs) and soil with chemical concentrations that are above human health exposure limits. The findings of previous investigations indicate that a variety of chemical substances (used oil, gasoline, diesel fuel, JP-4 fuel, acetone, and solvents) have been sprayed onto the ground surface and mock aircraft, then ignited for training purposes. Details of the historical Site investigation activities are provided in the *Original and Former Fire Training Facilities, Additional Investigations Report* (Apex, November 20, 2018). During the sampling events conducted in April and September 2017, measurable SPHs were detected in well MW-12. Total petroleum hydrocarbons (TPHs), polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs) were detected in one or more wells. Polychlorinated biphenyls (PCBs) were detected in one well (MW-10A). Metals were detected in each well. PFAS were detected in each well; and several grab groundwater samples from soil borings were above the EPA HA of 70 nanograms per liter (ng/L) for combined PFOA and PFOS.

The following provides a summary of the investigations completed at the fire training facilities.

- **1988 Site Characterization.** The Former Facility was first investigated in 1988 by Roger N. Smith and Associates (RNSA) to assess if the contamination of this area would interfere with the construction of the Current Facility. RNSA excavated 20 test pits to a maximum depth of 10.5 feet below ground surface (bgs) and collected surface and subsurface soil samples. Petroleum hydrocarbons and related VOCs and semi-volatile organic compounds (SVOCs) were detected in soil. Petroleum hydrocarbons were detected at concentrations up to 175,000 milligrams per kilogram (mg/kg). Metals detected in soil were generally consistent with background. VOCs were detected in groundwater.
- **1994 Century West Characterization.** Century West conducted site characterization to evaluate the nature and extent of impacts to soil and groundwater from fuels used during fire training activities. Century West excavated 10 test pits, completed 33 soil borings, and installed nine groundwater monitoring wells in the vicinity of both the original and former fire training facilities. Total petroleum hydrocarbons were detected in soil at up to 32,000 mg/kg and 14,000 mg/kg at the original and former fire training facilities, respectively. VOCs and PAHs were also detected in soil. Metals in soil were consistent with background. VOCs and PAHs were detected in groundwater.
- **1996 Geraghty & Miller Investigation.** Geraghty & Miller completed 12 borings and five monitoring wells and collected 14 surface soil samples at the Original and Former Facilities. TPH was detected in soil at up to 24,000 mg/kg and 14,000 mg/kg at the Original and Former Facilities, respectively. VOCs and PAHs were also detected in soil. Metals detected in soil were consistent with background.

PCBs were detected in two samples. Groundwater monitoring showed that the gradient was toward a nearby storm sewer. VOCs, PAHs, and bis(2-ethylhexyl)phthalate were detected in groundwater. Lead concentrations detected in groundwater were generally consistent with background.

- **1996 Remedial Action.** Beginning in 1996, the Port capped the Original and Former Facilities and implemented long-term groundwater monitoring as a remedial alternative. The protective cap prevents direct contact with soil containing petroleum hydrocarbons and related constituents. The cap generally consists of a demarcation layer and a gravel base. Portions of the cap expected to receive greater vehicle traffic include a cement-treated gravel base or asphalt-concrete. The demarcation layer was constructed with a 5-mil, white, low-density polyethylene (LDPE) material overlain by a medium-weight, woven, polypropylene geotextile. The LDPE material served as a visible marker separating the aggregate base from underlying soils containing residual contaminants.
- **2001 Hart Crowser Groundwater Sampling Adjacent to Storm Sewer Line.** In May 2001, Hart Crowser completed a test pit exploration adjacent to the storm sewer pipeline that runs west of the Original Facility area and runs west of the Former Facility area. Groundwater was encountered at a depth of about 7 feet bgs. After the groundwater that initially entered the excavation was purged, a groundwater sample was collected from the sand around the sewer pipeline. The groundwater sample was analyzed for PAHs and for benzene, toluene, ethylbenzene, and xylenes (BTEX), and neither PAHs nor BTEX compounds were detected in the test pit groundwater sample above the laboratory method detection limit (Hart Crowser, 2001).
- **Groundwater Monitoring – 1994 to 2007.** Groundwater sampling from monitoring wells was conducted quarterly from 1994 to 1996, semi-annually in 1997, and annually from 1998 through 2007. The monitoring consistently showed a groundwater gradient toward the stormwater conveyance system. Early sampling identified VOCs and PAHs above human health and ecological screening levels. By 2007, benzene was above screening levels in only one well (MW-12).
- **Separate Phase Hydrocarbon Removal – 1996 to 2007.** Beginning in December 1996, the removal of SPH using a sorbent sock was conducted in well MW-12. The thickness of SPH was measured during each groundwater monitoring event and the sorbent sock removed and/or replaced as appropriate (Hart Crowser, 2002). The sorbent socks installed from 1998 through 2007 had no indications of hydrocarbons absorption (i.e. no visual observation of staining; Ash Creek Associates, 2007); therefore, use of the socks ceased in 2007.
- **Reconnaissance Sampling – April 2017.** Assessment of recent and historical groundwater data (comparison of data to DEQ SLVs and other risk-based screening) indicated exceedances of arsenic, barium, lead, 1,2,4-trimethylbenzene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, 1-methylnaphthalene, total PCBs, TPHd, and TPHo above preliminary screening levels. Detected concentrations of PFOA and PFOS in the vicinity of the Site were above the EPA HA for drinking water. Based on this assessment, in addition to the SPH identified in MW-12, concentrations of TPH, VOCs, PCBs, and PAHs that exceeded applicable SLVs appeared to be confined to the area

surrounding well MW-10A and MW-11, while metals concentrations were in the general range of background (Apex, 2017b).

- **PFAS Investigation 2017.** Assessment of groundwater, soil, stormwater, surface water, and sediment and selection of PFAS screening levels was conducted to assess the risk to potential receptors from constituents detected in the various media. PFAS concentrations detected in shallow groundwater (OD) are delineated to the SLVs to the north, south, and east of the Original and Former Facilities. PFAS concentrations in deep groundwater (Upper CRSA) are present beneath the Original and Former Facilities at concentrations above the SLVs and on-site stormwater and surface water (drainage ditch) samples had detected PFAS concentrations above SLVs. A groundwater sample was analyzed from the production well located at the PDX Quick Turnaround (QTA) Facility and PFAS were not detected, indicating that PFAS detected at the fire training facilities are not migrating within the CRSA toward the City of Portland Columbia South Shore Wellfield; off-site surface water and composite sediment sample concentrations were below selected SLVs or not detected. Additionally, a video survey was performed to assess the integrity of the conveyance system pipe and suggests that groundwater infiltration into the stormwater pipe is occurring (Apex, 2018a).
- **PFAS Investigation 2018.** Additional investigation activities were completed from May through July 2018 to further delineate the extent of PFAS impacts from the Original and Former Facilities. Concentrations of PFAS were detected in groundwater below the EPA HA level to the north, northeast, and east (including the former fire station area), southeast, and south of the current Fire Training Facilities. PFAS compounds were detected at concentrations above the laboratory method reporting limit in stormwater and surface water samples, but below the selected SLVs. Deep groundwater (Upper CRSA) monitoring wells were installed, and the results of groundwater samples collected indicated concentrations below the EPA HA level with the exception of one monitoring well (DW-3). PFAS compounds were not detected above laboratory method reporting limits in analyzed soil samples. Groundwater samples were also obtained from two irrigation wells installed in the upper CRSA and located in the City of Portland's Columbia South Shore Well Field. PFAS compounds were not detected in the two irrigation wells above the method reporting limit (Apex, 2018c).
- **PFAS Investigation 2019.** During the first, second, and third quarter 2019 monitoring events, shallow PFAS groundwater impacts were detected primarily within the area of the Original and Former Facilities. Downgradient surface water sample concentrations (SW-2 and SW-3) were generally consistent with 2017 and 2018 results. The PFAS concentrations in surface water were below the construction worker and aquatic organisms SLVs. Concentrations of PFOA and PFOS were detected at the stormwater Outfall 1N, below the selected SLVs for construction workers and aquatic organisms.

2.3 PFAS Regulatory Status

Since the 1940s, PFAS have been used in many industrial and commercial applications. The most extensively produced PFAS chemicals in the United States were PFOA and PFOS. By 2002, all production of PFOS had been voluntarily discontinued by manufacturers in the United States. In 2015, as part of the PFOA Stewardship Program, eight major U.S. chemical manufacturers agreed to eliminate the production of PFOA. The U.S. EPA amended the Significant New Use Rule to include PFAS under the Toxic Substances Control Act (TSCA) and in January 2015, it required manufacturers and importers to notify the U.S. EPA at least 90 days prior to starting or resuming use of PFOA and related compounds. PFAS are now regulated and phase-outs of PFOA/PFOS and precursor compounds are established in the USA, European Union (EU), Canada, and Australia.

In 2016, the U.S. EPA established a provisional HA level of 70 ng/L for combined concentrations of PFOS and PFOA in drinking water. This provision was updated in 2016 to include chronic exposure of PFOS and PFOA combined. HAs provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water. The EPA's health advisories are non-enforceable and non-regulatory and provide technical information to state agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination. Additionally, in 2012, PFAS compounds, including PFOS, PFOA, perfluorononanoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS), perfluoroheptanoic acid (PFHpA), and perfluorobutane sulfonic acid (PFBS), were added to the Unregulated Contaminant Monitoring Rule (UCMR) to be monitored in public water supply systems. The U.S. EPA uses the UCMR to collect data for contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (SDWA).

In February 2019, the EPA published *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan* (EPA 823R18004; EPA, 2019). The Plan described actions previously taken by EPA, risk management for PFAS, EPA's plan to develop recommendations and standards, mitigating PFAS exposures, risk communication, and additional research, development, and technical assistance information.

In November 2019, the EPA requested public input on adding PFAS chemicals to the Toxics Release Inventory (TRI). Input received will help EPA determine whether data and information are available to fulfill the TRI chemical listing criteria. In December 2019, the EPA published a new validated laboratory method for testing PFAS in drinking water (Method 533). This Method focuses on short chain PFAS and compliments existing Method 537.1. In December 2019, the EPA also issued *Interim Recommendations for Addressing Groundwater Contaminated with Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonate (PFOS)*. The interim recommendations include using a screening level of 40 ng/L to determine if PFOA and/or PFOS is present at a site and may warrant further attention, and using the HA of 70 ng/L as the preliminary remediation goal (PRG) for contaminated groundwater that is a current or potential source of drinking water, where no state or tribal maximum contaminant level (MCL) or other applicable or relevant and appropriate requirements

(ARARs) are available or sufficiently protective. The PRG would be initially a target for cleanup and adjusted on a site-specific basis.

Several states such as New Jersey, Michigan, and Vermont have established SLVs and MCLs for PFAS in groundwater, surface water, soil, and sediment. Currently, there are no federal or Oregon established SLVs or MCLs for PFAS. The Port recognizes that final risk-based screening criteria, when they are promulgated by Oregon or the EPA, may be different than the current EPA health advisory level.

2.4 Geology and Hydrogeology

Wells monitored during this investigation are screened in either the shallow overbank deposits or the deeper CRSA. Overbank deposits consist of fine-grained sediments deposited in floodplains adjacent to river channels. In this environment, natural levees are present along the riverbank immediately adjacent to the channel and are thickest at the channel bank and thin toward the floodplain. Sediments accumulate due to the sudden drop in velocity as water overflows the confining bank. The crest is somewhat below the highest flood level. Away from the channel is the floodplain environment, which is characterized by low relief, generally poor drainage, and fine, organic-rich sediment such as silt or clay.

Overbank deposits are present throughout PDX and are typically between 50 and 60 feet thick (the OD ranges from 20 to 100 feet thick). From explorations, the overbank deposits consist of soft to stiff, gray (upper portions may be brown), layers of silty clay, silt, silty sand, and sandy silt, with occasional organic or wood debris. Individual layers vary from 5 to 20 feet in thickness. Sandy layers are more likely to be present in the lower portion of this unit, especially where it transitions to the CRSA (if present).

The CRSA fills a former channel of the ancestral Columbia River, just south of the present-day Columbia River channel. This paleochannel segment has a depth of more than 300 feet, eroded within older sedimentary units such as the TGA and CU1. The approximate southern extent of this channel generally corresponds to the southern limit of PDX. Where present, the top of the CRSA is approximately 50 to 60 feet bgs. The CRSA is comprised of medium-dense to dense, gray, gray-brown, or black, fine- to medium-grained, quartz-rich basaltic sand. Traces of silt, siltstone and sandstone fragments, muscovite flakes, wood, shells, and coarse sand and gravel occur throughout the unit. The CRSA generally becomes siltier with depth; however, in several explorations, the bottom 10 to 40 feet encountered a coarse sand and gravel layer with minor boulders. This layer probably represents channel lag (bedload) from the former channel.

The regional and local geology and hydrogeology is discussed in greater detail in the *Original and Former Fire Training Facilities, Additional Investigations Report* (Apex, November 20, 2018).

2.5 Screening Levels

Currently, there are no applicable DEQ screening levels for PFAS in groundwater, stormwater, surface water, sediment, or soil. In the *Revised Investigation Results Report* dated January 31, 2018 (Apex, 2018a), the potential Site receptors and exposure pathways were identified and screening levels that had been developed by the EPA, other U.S. states, and countries globally were surveyed and selected based on receptor and pathway. The screening levels were revisited in December 2019. Appendix A includes a summary of the results of the survey of drinking water, groundwater, and surface water screening levels.

Previously collected soil samples were compared to the available EPA and Texas screening levels. Soil results do not exceed these residential direct contact screening levels.

The screening levels selected for the potential Site receptors and pathways are discussed below. During the third quarter 2019 sampling event, the PFAS list was expanded to 24 compounds; therefore, additional screening levels were reviewed and applied at that time.

- Human Health
 - Drinking water (Residential) – EPA HA for PFOS and PFOA. For the remaining PFAS compounds, Texas residential drinking water, North Carolina drinking water, Canada drinking water, and Germany groundwater values were used.
 - Direct contact with surface water/stormwater/sediment (Construction Worker and Recreational) – the former Maine screening level for PFOS and PFOA. SLVs for the remaining PFAS compounds were not identified during the survey.
- Ecological
 - Direct contact with surface water – the Michigan water quality values for aquatic species (final aquatic value) for PFOS and PFOA. SLVs for remaining PFAS compounds were not identified during the survey.

Based on the receptors/pathways identified above and the results of the survey of drinking water, groundwater, and surface water screening levels detailed in the *Revised Investigation Results Report* (Apex, 2018a), selected screening levels for PFAS are applied in Tables 4 through 6. As documented in Section 2.3, in late December 2019 the EPA introduced an interim recommendation of 40 ng/L to determine if PFOA/PFOS is present at a site and may warrant further attention. To be consistent with the first through third quarters 2019, the fourth quarter groundwater data was screened against the EPA HA and Texas residential drinking water criteria in accordance with the Work Plan (Apex, 2018b). The EPA interim recommendation may be used during future sampling events.

In early 2017, Oregon Air National Guard (OANG) consultant, Leidos, proposed screening values for a PFAS investigation being conducted at the Portland Air National Guard facility, located on the south side of the Port

of Portland PDX property. The proposed OANG screening levels for groundwater are the same as those selected for this investigation.

3.0 Field Activities

3.1 Investigation Preparatory Activities

Property Access. Apex provided notification to Port personnel and Port Airfield Operations (OPS) to coordinate access to the Site at PDX. The notifications were submitted to OPS in advance and included the following: Port project manager contact information; Apex project manager and PDX field staff contact information; summary of field work; site plan depicting work locations; ingress and egress locations for Apex; and work schedule. All unbadged Apex employees were escorted by badged Apex employees. Airside OPS were notified of contractors' arrival and departure.

Flagging/Barricading. For select areas, work areas were delineated with cones, barricades, and vehicles with amber flashing beacons. During field investigation activities, airside Port Airfield Operations notifications were completed in accordance with Port requirements.

Site Health and Safety Plan. A Site-specific health and safety plan (HASP) was prepared for the activities. The HASP was prepared in general accordance with the Occupational Safety and Health Act (OSHA) and the Oregon Administrative Rules (OAR). A copy of the HASP was reviewed and signed by all field staff and maintained on-Site during the field activities. Prior to performing on-Site work, Apex prepared a Job Safety Analysis (JSA) guiding Site- and project-specific activities, risks, and risk mitigation measures. Safety topics were refreshed daily using a daily tailgate safety meeting, conducted by Apex's Site Supervisor or Site Safety Officer.

3.2 Methods and Procedures

3.2.1 PFAS-Specific Sampling Procedures

To reduce the chance of inadvertent PFAS contamination of samples, Apex sampling personnel and subcontractors avoided using PFAS-containing items during the sampling process. Items commonly used in sampling processes that may contain PFAS include polytetrafluoroethylene (PTFE, also known as Teflon), low-density polyethylene (LDPE), and polypropylene. Other common items that may contain PFAS include aluminum foil, post-it notes, waterproof field books, markers, chemical ice packs (e.g. blue ice), certain decontamination soaps, and certain product packaging (e.g. such as that found on pre-wrapped foods and snacks). Similarly, many clothing items contain PFAS, such as those coated with Teflon or incorporating a Gore-Tex membrane. Clothing items worn by Apex field staff had been washed at least six times and known PFAS-containing products were avoided during sample collection. In addition, field personnel avoided the use of PFAS-containing products such as cosmetics, moisturizers, insect repellent, sunscreen, and hand

cream. Nitrile gloves were used during all sample collection activities, including equipment set-up, sample collection, and the sealing of containers. PFAS contamination prevention protocols were reviewed with subcontractors and personnel daily during the field activities.

3.2.2 Surface Water Sampling

Surface Water Sample Collection. On November 8, 2019, two surface water grab samples were collected using an extension pole and laboratory-supplied sample containers to assess the seasonal variation of PFAS concentrations in the vicinity of and downgradient of the Original and Former Facilities. An attempt was made to collect surface water from the drainage ditch located approximately 2,400 feet northwest of the Original and Former Facilities at the culvert inlet to the stormwater conveyance system (sample location Ditch B); however, the ditch was dry during the sampling event. Surface water samples were collected downstream of the Current and Former Facilities at the same locations sampled previously during the 2017, 2018, and first, second and third quarter 2019 sampling events. Surface water sample SW-2 was collected from the drainage ditch at a location immediately east of the drainage ditch at its intersection with Sunderland Ave, approximately 1.1 miles southwest of the Site. Surface water sample SW-3 was collected from the drainage ditch near MCDD Pump Station #2, approximately 1.7 miles southwest of the Site. Each of the surface water sample locations are presented on Figure 8. Samples are collected from the same locations during each event to evaluate seasonal trends.

3.2.3 Stormwater Sampling

Outfall Sample Collection. On November 8, 2019, a grab stormwater sample was collected from the catch basin located directly upgradient of outfall OF1N (Figure 8). Laboratory-specific containers were used for direct grab stormwater sample collection.

3.2.4 Groundwater Monitoring

Groundwater levels were measured on October 28, 2019 from the expanded shallow (OD) monitoring well network (wells MW-1 through MW-33) and from the three deep (CRSA) monitoring wells (DW-1 through DW-3) at the Site. The well caps were removed and water levels allowed to equilibrate before the measurements were taken. The depth to groundwater, free product, and/or sheen were measured in each well to the nearest 0.01 foot using an electronic oil-water interface probe. Additional monthly gauging events were conducted on September 27, 2019, December 2, 2019, and December 30, 2019. Groundwater elevations are provided in Table 2, and groundwater contour maps for the shallow (OD) and deep (CRSA) October 28, 2019 data are presented as Figures 3 and 4.

Groundwater samples were collected on November 6 through 8, 2019 from the three deep (CRSA) monitoring wells (DW-1 through DW-3; Figures 2 and 7), and from the following shallow (OD) monitoring wells: MW-1, MW-3, MW-4, MW-8, MW-10A, and MW-14 through MW-33 (Figures 2, 5, and 6). Low-flow purging methods

were used and parameters (pH, ORP, DO, specific conductivity, and temperature) were measured during the purge process using a water quality meter and a flow cell connected to the discharge tubing of the sample pump. The turbidity of the water was monitored visually with color and the clarity of the water recorded on the sampling data sheet. Purging was considered complete when the water is visually clear and field parameters have stabilized to within 10 percent of the previous measurement for three consecutive three-minute intervals. Groundwater monitoring field sheets are presented in Appendix B and field parameters are presented in Table 3.

3.2.5 Analytical Program

Chemical analyses were performed on the collected groundwater, stormwater, and surface water samples. Samples were analyzed on a standard turnaround time (usually 21 days depending on analyses). Analytical laboratory reports and a data quality review are provided in Appendix C.

Groundwater Samples. All groundwater samples were analyzed for PFAS. PFAS analysis by Isotope Dilution Method (formerly Modified EPA Method 537) was conducted by Vista. Reported PFASs included 24 compounds: PFBS, Perfluorobutanoic acid (PFBA), Perfluoropentane sulfonic acid (PFPeS), Perfluoroheptane sulfonic acid (PFHpS), Perfluoropentanoic acid (PFPeA), PFHpA, PFHxS, Perfluorohexanoic acid (PFHxA), PFOS, PFOA, Perfluorotetradecanoic acid (PFTeDA), PFNA, Perfluorodecanoic acid (PFDA), Perfluorononane sulfonic acid (PFNS), Perfluorodecane sulfonic acid (PFDS), Perfluoroundecanoic acid (PFUdA), Perfluorododecanoic acid (PFDoA), Perfluorotridecanoic acid (PFTrDA), N-Ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA), N-Methylperfluoro-1 octanesulfonamidoacetic acid (N-MeFOSAA), Perfluorooctane sulfonamide (PFOSA), and Fluorotelomer sulfonate (C4, 4:2 FTS; C6, 6:2 FTS; and C8, 8:2 FTS).

Surface Water and Outfall Samples. Stormwater and surface water samples were analyzed for the list of 24 PFAS by Isotope Dilution Method (formerly Modified EPA Method 537). PFAS analysis was conducted by Vista.

3.2.6 Investigation-Derived Waste

Investigation-derived waste (IDW) generated during the groundwater monitoring activities consisted of non-hazardous purge and decontamination water. The water was collected in five-gallon buckets during sampling and subsequently transferred to 55-gallon drums that were stored on-site. Approximately 1 gallon of water was purged from each monitoring well; therefore, a total of approximately 28 gallons was purged.

3.2.7 Work Plan Deviations

No work plan deviations occurred during the fourth quarter 2019 monitoring event.

4.0 Investigation Results

The following sections present the analytical results of samples submitted for chemical analyses. Laboratory analytical reports and a review of laboratory data quality are included in Appendix C. Analytical results are summarized in Tables 4 through 6 and are summarized on Figures 5 through 8. Groundwater elevation data are presented in Table 2.

4.1 Surface Water Analytical Results

A total of 13 PFAS compounds (including PFBA, PFBS, PFPeS, PFPeA, PFHxA, PFHpA, PFHxS, PFOA, PFOS, PFNA, PFDA, 6:2 FTS, and 8:2 FTS) were detected in the surface water samples collected on November 8, 2019. Detected PFOA concentrations in the surface water were 37.7 ng/L in sample SW-2 and 93.8 ng/L in sample SW-3. Detected PFOS concentrations in the surface water were 90.2 ng/L in sample SW-2 and 141 ng/L in sample SW-3. PFAS results for surface water are presented in Table 4. Detected concentrations were compared to the Maine recreational screening values for qualitative purposes only, as the off-Site ditches are not used recreationally. PFAS concentrations observed in samples from SW-2 and SW-3 were below the Maine recreational screening values. In addition, detected concentrations were compared to the Michigan aquatic organisms screening values; no exceedances were identified. As described in Section 2.5, the Maine and Michigan screening levels were chosen because there are no current screening levels promulgated in Oregon.

4.2 Stormwater Analytical Results

A total of 14 PFAS compounds (including PFBA, PFBS, PFPeS, PFPeA, PFHxA, PFHpA, PFHxS, PFHpS, PFOA, PFOS, PFNA, 4:2 FTS, 6:2 FTS, and 8:2 FTS) were detected in the stormwater sample collected at OF-1N-NW on November 8, 2019. The detected PFOA concentration was 147 ng/L and the detected PFOS concentration was 302 ng/L. PFAS results for stormwater are presented in Table 4. Detected concentrations were below the Maine recreational screening values, which are used for qualitative purposes only, as the off-Site ditches and outfall are not used recreationally. Detected concentrations were within the range of concentrations detected previously in samples collected in 2017 through the third quarter of 2019. As described in Section 2.5, the Maine and Michigan screening levels were chosen because there are no current screening levels promulgated in Oregon.

4.3 Groundwater Analytical Results

This section presents a summary of groundwater analytical results for the reporting period. The detected concentrations were generally consistent with past results from the 2017, 2018, and first, second, and third quarter 2019 sampling events.

4.3.1 Groundwater Monitoring – OD Wells

Groundwater samples were collected from wells MW-1, MW-3, MW-4, MW-8, MW-10A, and MW-14 through MW-33, which are installed in the shallow overbank deposits. A total of 17 PFAS compounds (including PFBA, PFBS, PFPeS, PFPeA, PFHxA, PFHpA, PFHxS, PFHpS, PFOA, PFOS, PFNA, PFNS, PFDA, PFOSA, 4:2 FTS, 6:2 FTS, and 8:2 FTS) were detected in one or more of the 25 groundwater samples collected from the shallow (OD) monitoring wells. PFOA concentrations in shallow groundwater ranged from not detected above the MRL to 17,400 ng/L in well MW-28. PFOS concentrations ranged from not detected above the MRL to 36,200 ng/L in well MW-4. PFAS results for shallow (OD) groundwater samples are presented in Table 5 and on Figures 5 and 6.

Evaluation of these results suggests that the lateral extent of shallow groundwater impacts has been broadly delineated, and that groundwater impacts do not extend off-site. Concentrations of PFOS and PFOA generally attenuate with distance from the Original and Former Fire Training Facilities.

4.3.2 Groundwater Monitoring – Upper CRSA Wells

Groundwater samples were collected from wells DW-1 through DW-3 which were installed in the Upper CRSA on July 19, 2018. Upper CRSA wells are installed to depths of up to 81 feet bgs with screened interval from 70 to 80 and 71 to 81 feet bgs. PFAS results for Upper CRSA groundwater samples are presented in Table 6 and on Figure 7. PFOS was detected above the MRL in well DW-3 (at 3.47 ng/L), below the SLV of 70 ng/L. PFAS were not detected at wells DW-1 or DW-2.

4.4 Groundwater Elevations and Flow Direction

Groundwater levels were measured on October 28, 2019 from wells DW-1 through DW-3 and wells MW-1 through MW-33. Groundwater elevations are presented in Table 2 and the October 28, 2019 elevations and the shallow (OD) and deep (CRSA) elevation contours are depicted on Figures 3 and 4, respectively. In general, groundwater elevations are consistent with historical monitoring events in monitoring wells installed prior to 2019. Groundwater elevations in the Upper CRSA wells (DW-1 through DW-3) are generally consistent with static water level observations in shallow wells (MW-1 through MW-33) installed at the Original and Former Facilities.

As shown on Figures 3 and 4, the groundwater flow direction at the Site is variable. Areas of local shallow (OD) flow direction variation are observed due to the topography and the on-site stormwater drainage ditches. A local shallow groundwater depression was observed in the vicinity of the fire training areas. The deep (CRSA) flow direction is also variable; during the first quarter 2019 event groundwater flow was towards the north and during the second quarter 2019 event groundwater flow was towards the west. During the third and fourth quarter 2019 events, the hydraulic gradient was towards the north-northeast in the deep (CRSA) zone. The hydraulic gradient in October 2019 varied between approximately 0.004 and 0.05 feet/feet. Based on the

gradients observed, soil piles near select monitoring wells (e.g. wells MW-27 through MW-30) may be surcharging the ground surface and impacting shallow groundwater flow and direction. The soil piles are located north of North Perimeter Road and west of the Jet Fuel Storage area (Figure 2).

SPH were observed at wells MW-11 (0.15-foot thickness) and MW-12 (0.07-foot thickness) during the October gauging event (consistent with observations made during the first, second and third quarters 2019). The Port will continue to monitor SPH presence and will consider additional product recovery efforts at these monitoring wells during future groundwater monitoring events. Recovered SPH will be staged in a 55-gallon drum for subsequent off-site disposal.

4.5 Laboratory Analytical Data Quality

Apex conducted a review of the analytical laboratory data. The results of the data quality control review indicate the data are acceptable for the intended use in this monitoring report. A summary of the data quality review is provided in Appendix C.

4.6 Trend Analysis

Available analytical data for PFOA and PFOS were evaluated for the entire data set to assess seasonal variability and concentration trends at the Site. Trend graphs are provided in Appendix D. In general, concentrations of PFOA and PFOS were observed to increase or decrease in response to groundwater level fluctuations throughout each of the seasons. As groundwater elevations decreased, concentrations of PFOA and PFOS also decreased at wells MW-1, MW-3, MW-4, MW-8, MW-28, MW-29 and MW-31. An inverse trend was observed at wells MW-10A, MW-14, and MW-26 (i.e. as groundwater elevations decreased, concentrations of PFOA and PFOS increased).

5.0 Conclusions

The investigation activities detailed in this report were completed to address several data gaps identified following Site activities conducted in 2017 and 2018. Characterization activities completed to address those data gaps included further delineation of groundwater, stormwater and surface water impacts. The investigation included the sampling of 28 monitoring wells, and the collection of two surface water and one stormwater samples. The results of the investigation are summarized as follows:

- Shallow Groundwater – PFAS concentrations in shallow groundwater (OD) were detected above the EPA HA level (70 ng/L) primarily within the area of the former fire training facilities. Concentrations of PFOS and PFOA were detected in multiple monitoring wells, and concentrations generally attenuate with distance from the Original and Former Fire Training Facilities.
- Deep Groundwater – Deep (Upper CRSA) groundwater results were non-detect in wells DW-1 and DW-2. PFOS was detected above the MRL in well DW-3 (at 3.47 ng/L), below the SLV of 70 ng/L.

-
- Stormwater and Surface Water – Downgradient surface water sample concentrations (SW-2 and SW-3) were generally consistent with 2017, 2018, and first through third quarter 2019 results. The PFAS concentrations in surface water are below the construction worker and aquatic organisms SLVs. Concentrations of PFOA (147 ng/L) and PFOS (302 ng/L) were detected at the stormwater Outfall 1N below the selected Maine SLVs.

Based on the results of the of quarterly groundwater sampling events conducted during CY 2019 (first through fourth quarter 2019), PFAS in shallow groundwater were detected above the EPA HA primarily within the area of the Original and Former Facilities. Concentrations of PFAS fluctuate in response to the water table elevation but are generally stable. Stormwater and surface water sampling during CY 2019 has detected PFAS in surface water generally below the construction worker and aquatic organisms SLVs with the exception of the third quarter result of PFOA at SW-2. Concentrations of PFOA and PFOS have been detected above the SLVs in stormwater during two quarters. Based on the results of the monitoring to date, the need for additional shallow groundwater (OD), deeper groundwater (CRSA) and surface water monitoring points will be assessed.

6.0 References

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- Apex, 2018b. *Additional Investigation Work Plan Addendum, Original and Former Fire Training Facilities, Portland International Airport*. Portland, Oregon, ECSI No. 3324. November 20, 2018.
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- Hart Crowser, 2001. *Groundwater Monitoring Report, Original and Former Fire Training Pits, Portland International Airport, Portland, Oregon*. Port of Portland. July 25, 2001.
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Table 1
Monitoring Program
Fire Training Facilities
Port of Portland

Well ID	Gauging	Sampling
<i>Overbank Deposit Wells (Shallow Groundwater)</i>		
MW-1	Monthly	Quarterly
MW-2	Monthly	--
MW-3	Monthly	Quarterly
MW-4	Monthly	Quarterly
MW-5	Monthly	--
MW-6	Monthly	--
MW-7	Monthly	--
MW-8	Monthly	Quarterly
MW-9	Monthly	--
MW-10A	Monthly	Quarterly
MW-11	Monthly	--
MW-12	Monthly	--
MW-13	Monthly	--
MW-14	Monthly	Quarterly
MW-15	Monthly	Quarterly
MW-16	Monthly	Quarterly
MW-17	Monthly	Quarterly
MW-18	Monthly	Quarterly
MW-19	Monthly	Quarterly
MW-20	Monthly	Quarterly
MW-21	Monthly	Quarterly
MW-22	Monthly	Quarterly
MW-23	Monthly	Quarterly
MW-24	Monthly	Quarterly
MW-25	Monthly	Quarterly
MW-26	Monthly	Quarterly
MW-27	Monthly	Quarterly
MW-28	Monthly	Quarterly
MW-29	Monthly	Quarterly
MW-30	Monthly	Quarterly
MW-31	Monthly	Quarterly
MW-32	Monthly	Quarterly
MW-33	Monthly	Quarterly
<i>Upper CRSA (Deep Groundwater)</i>		
DW-1	Monthly	Quarterly
DW-2	Monthly	Quarterly
DW-3	Monthly	Quarterly
<i>Stormwater</i>		
OF1N- NW	--	Quarterly
<i>Surface Water</i>		
SW-2	--	Quarterly
SW-3	--	Quarterly

Notes:

1. -- = Not applicable.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-1 (17.61)	04/26/94	7.55	--	--	10.06
	08/08/94	8.76	--	--	8.85
	11/08/94	6.76	--	--	10.85
	02/20/95	5.26	--	--	12.35
	05/12/95	6.61	--	--	11.00
	09/18/95	8.73	--	--	8.88
	12/28/95	6.27	--	--	11.34
	02/29/96	5.39	--	--	12.22
	04/23/96	6.09	--	--	11.52
	05/30/96	6.10	--	--	11.51
	06/25/96	6.90	--	--	10.71
	12/11/96	6.37	--	--	11.24
	04/11/97	7.15	--	--	10.46
	10/27/97	8.39	--	--	9.22
	04/23/98	8.23	--	--	9.38
	04/06/99	7.38	--	--	10.23
	04/28/00	7.89	--	--	9.72
	05/07/01	8.86	--	--	8.75
	05/31/02	8.23	--	--	9.38
	06/04/03	7.98	--	--	9.63
	05/21/04	8.67	--	--	8.94
	08/25/05	9.62	--	--	7.99
	08/10/06	9.15	--	--	8.46
	09/06/07	9.65	--	--	7.96
	04/20/17	6.81	--	--	10.80
	09/26/17	9.24	--	--	8.37
	01/31/19	8.60	--	--	9.01
	02/28/19	8.37	--	--	9.24
	03/22/19	8.47	--	--	9.14
	04/29/19	7.96	--	--	9.65
	05/31/19	8.37	--	--	9.24
	06/28/19	8.96	--	--	8.65
	07/30/19	9.25	--	--	8.36
	08/29/19	9.52	--	--	8.09
	09/27/19	9.52	--	--	8.09
	10/28/19	9.56	--	--	8.05
	12/02/19	9.75	--	--	7.86
	12/30/19	9.35	--	--	8.26
MW-2 (17.84)	04/26/94	9.23	--	--	8.61
	08/08/94	9.83	--	--	8.01
	11/08/94	9.11	--	--	8.73
	02/20/95	8.38	--	--	9.46
	05/12/95	9.06	--	--	8.78
	09/18/95	9.77	--	--	8.07
	12/28/95	8.82	--	--	9.02
	02/29/96	7.83	--	--	10.01
	04/23/96	8.57	--	--	9.27
	05/30/96	8.51	--	--	9.33
	06/25/96	8.82	--	--	9.02
	12/11/96	9.17	--	--	8.67
	04/11/97	9.69	--	--	8.15
	10/27/97	10.27	--	--	7.57
	04/23/98	9.50	--	--	8.34
	04/06/99	9.57	--	--	8.27
	04/28/00	9.76	--	--	8.08
	05/07/01	10.79	--	--	7.05
	05/31/02	10.08	--	--	7.76
	06/04/03	10.04	--	--	7.80
	05/21/04	10.43	--	--	7.41
	08/25/05	10.86	--	--	6.98
	08/10/06	10.44	--	--	7.40
	09/06/07	10.74	--	--	7.10
	04/20/17	9.08	--	--	8.76
	09/26/17	10.60	--	--	7.24
	01/31/19	10.24	--	--	7.60
	02/28/19	10.15	--	--	7.69
	03/22/19	10.19	--	--	7.65
	04/29/19	9.85	--	--	7.99
	05/31/19	10.01	--	--	7.83
	06/28/19	10.40	--	--	7.44
	07/30/19	10.55	--	--	7.29
	08/29/19	10.69	--	--	7.15
	09/27/19	10.70	--	--	7.14
	10/28/19	10.67	--	--	7.17
	12/02/19	10.75	--	--	7.09
	12/30/19	10.53	--	--	7.31

¹Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-3 (17.59)	04/26/94	6.77	--	--	10.82
	08/08/94	8.50	--	--	9.09
	11/08/94	3.93	--	--	13.66
	02/20/95	3.74	--	--	13.85
	05/12/95	5.08	--	--	12.51
	09/18/95	6.91	--	--	10.68
	12/28/95	4.30	--	--	13.29
	02/29/96	3.41	--	--	14.18
	04/23/96	4.89	--	--	12.70
	05/30/96	4.76	--	--	12.83
	06/25/96	5.42	--	--	12.17
	12/11/96	3.96	--	--	13.63
	04/11/97	6.15	--	--	11.44
	10/27/97	7.95	--	--	9.64
	04/23/98	6.79	--	--	10.80
	04/06/99	6.07	--	--	11.52
	04/28/00	6.56	--	--	11.03
	05/07/01	7.61	--	--	9.98
	05/31/02	7.8	--	--	9.79
	06/04/03	6.82	--	--	10.77
	05/21/04	8.25	--	--	9.34
	08/25/05	9.42	--	--	8.17
	08/10/06	8.85	--	--	8.74
	09/06/07	9.59	--	--	8.00
	04/20/17	6.70	--	--	10.89
	09/26/17	Not measured; unable to remove well cover.			
	01/31/19	9.30	--	--	8.29
	02/28/19	8.19	--	--	9.40
	03/22/19	8.65	--	--	8.94
	04/29/19	7.86	--	--	9.73
	05/31/19	8.39	--	--	9.20
	06/28/19	9.20	--	--	8.39
	07/30/19	9.71	--	--	7.88
	08/29/19	10.00	--	--	7.59
	09/27/19	9.85	--	--	7.74
	10/28/19	9.95	--	--	7.64
	12/02/19	10.00	--	--	7.59
	12/30/19	9.30	--	--	8.29
MW-4 (18.00)	04/26/94	8.14	--	--	9.86
	08/08/94	9.26	--	--	8.74
	11/08/94	6.58	--	--	11.42
	02/20/95	5.63	--	--	12.37
	05/12/95	7.57	--	--	10.43
	09/18/95	9.24	--	--	8.76
	12/28/95	6.55	--	--	11.45
	02/29/96	5.94	--	--	12.06
	04/23/96	7.05	--	--	10.95
	05/30/96	6.89	--	--	11.11
	06/25/96	7.92	--	--	10.08
	12/11/96	5.58	--	--	12.42
	04/11/97	7.26	--	--	10.74
	10/27/97	8.00	--	--	10.00
	04/23/98	7.95	--	--	10.05
	04/06/99	7.30	--	--	10.70
	04/28/00	7.67	--	--	10.33
	05/07/01	8.29	--	--	9.71
	05/31/02	8.21	--	--	9.79
	06/04/03	7.79	--	--	10.21
	05/21/04	8.48	--	--	9.52
	08/25/05	9.28	--	--	8.72
	08/10/06	8.77	--	--	9.23
	09/06/07	9.44	--	--	8.56
	04/20/17	7.08	--	--	10.92
	09/26/17	9.52	--	--	8.48
	01/31/19	8.48	--	--	9.52
	02/28/19	8.11	--	--	9.89
	03/22/19	8.45	--	--	9.55
	04/29/19	8.01	--	--	9.99
	05/31/19	8.45	--	--	9.55
	06/28/19	9.00	--	--	9.00
	07/30/19	9.34	--	--	8.66
	08/29/19	9.61	--	--	8.39
	09/27/19	9.45	--	--	8.55
	10/28/19	9.50	--	--	8.50
	12/02/19	9.65	--	--	8.35
	12/30/19	8.94	--	--	9.06

Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-5 (19.88)	04/26/94	11.19	--	--	8.69
	08/08/94	11.72	--	--	8.16
	11/08/94	9.96	--	--	9.92
	02/20/95	7.67	--	--	12.21
	05/12/95	10.71	--	--	9.17
	09/18/95	11.69	--	--	8.19
	12/28/95	9.16	--	--	10.72
	02/29/96	8.61	--	--	11.27
	04/23/96	10.15	--	--	9.73
	05/30/96	10.13	--	--	9.75
	06/25/96	10.77	--	--	9.11
	12/11/96	8.96	--	--	10.92
	04/11/97	8.46	--	--	11.42
	10/27/97	10.17	--	--	9.71
	04/23/98	9.84	--	--	10.04
	04/06/99	9.29	--	--	10.59
	04/28/00	9.62	--	--	10.26
	05/07/01	10.19	--	--	9.69
	05/31/02	9.88	--	--	10.00
	06/04/03	9.58	--	--	10.30
	05/21/04	10.13	--	--	9.75
	08/25/05	10.74	--	--	9.14
	08/10/06	10.31	--	--	9.57
	09/06/07	10.69	--	--	9.19
	04/20/17	10.65	--	--	9.23
	09/26/17	11.12	--	--	8.76
	01/31/19	10.82	--	--	9.06
	02/28/19	10.40	--	--	9.48
	03/22/19	10.85	--	--	9.03
	04/29/19	10.83	--	--	9.05
	05/31/19	10.95	--	--	8.93
	06/28/19	11.06	--	--	8.82
	07/30/19	11.00	--	--	8.88
	08/29/19	11.00	--	--	8.88
	09/27/19	11.05	--	--	8.83
	10/28/19	11.08	--	--	8.80
	12/02/19	11.11	--	--	8.77
	12/30/19	10.97	--	--	8.91
MW-6 (18.08)	04/26/94	8.36	--	--	9.72
	08/08/94	9.21	--	--	8.87
	11/08/94	7.11	--	--	10.97
	02/20/95	5.04	--	--	13.04
	05/12/95	7.07	--	--	11.01
	09/18/95	9.15	--	--	8.93
	12/28/95	6.71	--	--	11.37
	02/29/96	5.65	--	--	12.43
	04/23/96	6.76	--	--	11.32
	05/30/96	6.58	--	--	11.50
	06/25/96	7.83	--	--	10.25
	12/11/96	5.97	--	--	12.11
	04/11/97	7.00	--	--	11.08
	10/27/97	8.48	--	--	9.60
	04/23/98	7.66	--	--	10.42
	04/06/99	6.70	--	--	11.38
	04/28/00	8.54	--	--	9.54
	05/07/01	8.99	--	--	9.09
	05/31/02	8.51	--	--	9.57
	06/04/03	8.22	--	--	9.86
	05/21/04	8.98	--	--	9.10
	08/25/05	9.68	--	--	8.40
	08/10/06	9.22	--	--	8.86
	09/06/07	9.82	--	--	8.26
	04/20/17	5.80	--	--	12.28
	09/26/17	8.93	--	--	9.15
	01/31/19	7.48	--	--	10.60
	02/28/19	6.65	--	--	11.43
	03/22/19	7.07	--	--	11.01
	04/29/19	6.91	--	--	11.17
	05/31/19	7.57	--	--	10.51
	06/28/19	8.36	--	--	9.72
	07/30/19	8.51	--	--	9.57
	08/29/19	9.38	--	--	8.70
	09/27/19	9.47	--	--	8.61
	10/28/19	9.57	--	--	8.51
	12/02/19	9.73	--	--	8.35
	12/30/19	8.85	--	--	9.23

¹Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-7 (17.61)	04/26/94	8.97	--	--	8.64
	08/08/94	9.76	--	--	7.85
	11/08/94	8.21	--	--	9.40
	02/20/95	7.14	--	--	10.47
	05/12/95	8.43	--	--	9.18
	09/18/95	9.54	--	--	8.07
	12/28/95	7.93	--	--	9.68
	02/29/96	7.62	--	--	9.99
	04/23/96	8.19	--	--	9.42
	05/30/96	8.23	--	--	9.38
	06/25/96	8.70	--	--	8.91
	12/11/96	8.00	--	--	9.61
	04/11/97	9.41	--	--	8.20
	10/27/97	9.68	--	--	7.93
	04/23/98	9.75	--	--	7.86
	04/06/99	9.48	--	--	8.13
	04/28/00	9.69	--	--	7.92
	05/07/01	10.06	--	--	7.55
	05/31/02	10.01	--	--	7.60
	06/04/03	9.61	--	--	8.00
	05/21/04	9.74	--	--	7.87
	08/25/05	10.58	--	--	7.03
	08/10/06	10.35	--	--	7.26
	09/06/07	10.86	--	--	6.75
	04/20/17	8.98	--	--	8.63
	09/26/17	10.78	--	--	6.83
	01/31/19	9.63	--	--	7.98
	02/28/19	9.27	--	--	8.34
	03/22/19	9.58	--	--	8.03
	04/29/19	9.45	--	--	8.16
	05/31/19	9.76	--	--	7.85
	06/28/19	10.25	--	--	7.36
	07/30/19	10.51	--	--	7.10
	08/29/19	10.70	--	--	6.91
	09/27/19	10.46	--	--	7.15
	10/28/19	10.56	--	--	7.05
	12/02/19	10.75	--	--	6.86
	12/30/19	9.71	--	--	7.90
MW-8 (18.15)	04/26/94	9.47	--	--	8.68
	08/08/94	9.99	--	--	8.16
	11/08/94	9.56	--	--	8.59
	02/20/95	7.91	--	--	10.24
	05/12/95	8.41	--	--	9.74
	09/18/95	9.96	--	--	8.19
	12/28/95	7.98	--	--	10.17
	02/29/96	6.82	--	--	11.33
	04/23/96	7.40	--	--	10.75
	05/30/96	7.23	--	--	10.92
	06/25/96	7.82	--	--	10.33
	12/11/96	6.97	--	--	11.18
	04/11/97	7.90	--	--	10.25
	10/27/97	9.39	--	--	8.76
	04/23/98	8.97	--	--	9.18
	04/06/99	7.70	--	--	10.45
	04/28/00	7.95	--	--	10.20
	05/07/01	9.60	--	--	8.55
	05/31/02	8.49	--	--	9.66
	06/04/03	8.11	--	--	10.04
	05/21/04	9.05	--	--	9.10
	08/25/05	9.96	--	--	8.19
	08/10/06	9.53	--	--	8.62
	09/06/07	10.15	--	--	8.00
	04/20/17	7.18	--	--	10.97
	09/26/17	9.72	--	--	8.43
	01/31/19	9.17	--	--	8.98
	02/28/19	8.80	--	--	9.35
	03/22/19	9.10	--	--	9.05
	04/29/19	8.16	--	--	9.99
	05/31/19	8.55	--	--	9.60
	06/28/19	9.36	--	--	8.79
	07/30/19	9.85	--	--	8.30
	08/29/19	10.10	--	--	8.05
	09/27/19	10.05	--	--	8.10
	10/28/19	10.00	--	--	8.15
	12/02/19	9.88	--	--	8.27
	12/30/19	9.30	--	--	8.85

¹Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-9 (17.07)	08/08/94	6.70	--	--	10.39
	11/08/94	4.11	--	--	12.98
	02/20/95	2.93	--	--	14.16
	05/12/95	4.95	--	--	12.14
	09/18/95	6.34	--	--	10.75
	12/28/95	4.02	--	--	13.07
	02/29/96	3.61	--	--	13.48
	04/23/96	3.88	--	--	13.21
	05/30/96	4.19	--	--	12.90
	06/25/96	4.87	--	--	12.20
	12/11/96	2.77	--	--	14.30
	04/11/97	4.25	--	--	12.82
	10/27/97	5.40	--	--	11.67
	04/23/98	4.74	--	--	12.33
	04/06/99	4.26	--	--	12.81
	04/28/00	4.62	--	--	12.45
	05/07/01	5.06	--	--	12.01
	05/31/02	5.03	--	--	12.04
	06/04/03	4.83	--	--	12.24
	05/21/04	5.32	--	--	11.75
	08/25/05	5.98	--	--	11.09
	08/10/06	5.72	--	--	11.35
	09/06/07	6.33	--	--	10.74
	04/20/17	4.76	--	--	12.31
	09/26/17	8.13	--	--	8.94
	01/31/19	5.40	--	--	11.67
	02/28/19	4.65	--	--	12.42
	03/22/19	5.80	--	--	11.27
	04/29/19	5.68	--	--	11.39
	05/31/19	6.14	--	--	10.93
	06/28/19	6.61	--	--	10.46
	07/30/19	7.31	--	--	9.76
	08/29/19	7.87	--	--	9.20
	09/27/19	7.40	--	--	9.67
	10/28/19	7.52	--	--	9.55
	12/02/19	7.79	--	--	9.28
	12/30/19	5.96	--	--	11.11
MW-10A (17.24)	02/29/96	3.69	--	--	13.55
	04/23/96	4.41	--	--	12.83
	05/30/96	4.58	--	--	12.66
	06/25/96	5.12	--	--	12.12
	12/11/96	3.41	--	--	13.83
	04/11/97	5.71	--	--	11.53
	10/27/97	5.30	--	--	11.94
	04/23/98	5.07	--	--	12.17
	04/06/99	4.58	--	--	12.66
	04/28/00	5.09	--	--	12.15
	05/07/01	5.22	--	--	12.02
	05/31/02	5.24	--	--	12.00
	06/04/03	5.27	--	--	11.97
	05/21/04	5.66	--	--	11.58
	08/25/05	6.28	--	--	10.96
	08/10/06	6.06	--	--	11.18
	09/06/07	6.54	--	--	10.70
	04/20/17	4.96	--	--	12.28
	09/26/17	7.21	--	--	10.03
	01/31/19	5.46	--	--	11.78
	02/28/19	5.12	--	--	12.12
	03/22/19	5.76	--	--	11.48
	04/29/19	5.71	--	--	11.53
	05/31/19	6.07	--	--	11.17
	06/28/19	6.36	--	--	10.88
	07/30/19	6.71	--	--	10.53
	08/29/19	6.99	--	--	10.25
	09/27/19	6.73	--	--	10.51
	10/28/19	6.93	--	--	10.31
	12/02/19	7.06	--	--	10.18
	12/30/19	5.96	--	--	11.28

¹Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-11 (17.35)	02/29/96	4.51	--	--	12.84
	04/23/96	4.88	--	--	12.47
	05/30/96	5.00	--	--	12.35
	06/25/96	5.41	--	--	11.94
	12/11/96	4.00	--	--	13.35
	04/11/97	5.18	--	--	12.17
	10/27/97	5.72	--	--	11.63
	04/23/98	5.47	--	--	11.88
	04/06/99	5.11	--	--	12.24
	04/28/00	5.48	--	--	11.87
	05/07/01	5.50	--	--	11.85
	05/31/02	5.64	--	--	11.71
	06/04/03	5.55	--	--	11.80
	05/21/04	5.77	--	--	11.58
	08/25/05	6.22	--	--	11.13
	08/10/06	6.13	--	--	11.22
	09/06/07	6.55	--	--	10.80
	04/20/17	5.33	--	--	12.02
	09/26/17	8.95	8.85	0.10	8.48
	01/31/19	6.50	6.49	0.01	10.86
	02/28/19	6.16	6.15	0.01	11.20
	03/22/19	6.80	6.75	0.05	10.59
	04/29/19	6.51	6.50	0.01	10.85
	05/31/19	7.02	6.90	0.12	10.43
	06/28/19	7.54	7.46	0.08	9.87
	07/30/19	8.21	8.20	0.01	9.15
	08/29/19	8.90	8.70	0.20	8.61
	09/27/19	8.61	8.60	0.01	8.75
	10/28/19	8.90	8.75	0.15	8.57
	12/02/19	8.89	8.88	0.01	8.47
	12/30/19	7.12	sheen	sheen	10.23
MW-12 (19.71)	02/29/96	7.04	--	--	12.67
	04/23/96	9.35	--	--	10.36
	05/30/96	9.37	--	--	10.34
	06/25/96	10.32	--	--	9.39
	12/11/96	5.91	--	--	13.80
	04/11/97	7.22	7.14	0.08	12.56
	10/27/97	10.11	9.83	0.28	9.84
	04/23/98	8.99	8.96	0.03	10.75
	04/06/99	7.38	--	--	12.33
	04/28/00	8.90	--	--	10.81
	05/07/01	9.62	--	--	10.09
	05/31/02	9.18	--	--	10.53
	06/04/03	8.47	--	--	11.24
	05/21/04	8.96	--	--	10.75
	08/25/05	10.63	--	--	9.08
	08/10/06	10.11	--	--	9.60
	09/06/07	10.68	--	--	9.03
	04/20/17	6.59	6.44	0.15	13.24
	09/26/17	10.52	10.40	0.12	9.29
	01/31/19	9.25	9.00	0.25	10.66
	02/28/19	8.69	8.50	0.19	11.17
	03/22/19	8.62	8.41	0.21	11.26
	04/29/19	8.37	8.14	0.23	11.52
	05/31/19	8.77	8.50	0.27	11.16
	06/28/19	9.07	8.80	0.27	10.86
	07/30/19	10.00	9.81	0.19	9.86
	08/29/19	10.66	10.53	0.13	9.15
	09/27/19	10.80	10.62	0.18	9.05
	10/28/19	10.93	10.86	0.07	8.84
	12/02/19	11.02	10.90	0.12	8.79
	10/30/19	10.61	10.50	0.11	9.19
MW-13 (18.53)	02/29/96	2.85	--	--	15.68
	04/23/96	3.43	--	--	15.10
	05/30/96	4.05	--	--	14.48
	06/25/96	4.82	--	--	13.71
	12/11/96	1.76	--	--	16.77
	04/11/97	3.98	--	--	14.55
	10/27/97	4.94	--	--	13.59
	04/23/98	4.50	--	--	14.03
	04/06/99	3.82	--	--	14.71
	04/28/00	4.63	--	--	13.90
	05/07/01	5.03	--	--	13.50
	05/31/02	5.15	--	--	13.38
	06/30/03	4.80	--	--	13.73
	05/21/04	5.27	--	--	13.26
	08/25/05	5.85	--	--	12.68
	08/10/06	5.55	--	--	12.98
	09/06/07	6.02	--	--	12.51
	04/20/17	3.30	--	--	15.23
	09/26/17	5.49	--	--	13.04
	01/31/19	4.47	--	--	14.06
	02/28/19	4.06	--	--	14.47
	03/22/19	4.60	--	--	13.93
	04/29/19	4.63	--	--	13.90
	05/31/19	4.95	--	--	13.58
	06/28/19	5.24	--	--	13.29
	07/30/19	5.51	--	--	13.02
	08/29/19	5.73	--	--	12.80
	09/27/19	5.61	--	--	12.92
	10/28/19	5.80	--	--	12.73
	12/02/19	5.92	--	--	12.61
	12/30/19	5.10	--	--	13.43

¹Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-14 (17.73)	02/29/96	2.27	--	--	15.46
	04/23/96	2.90	--	--	14.83
	05/30/96	3.36	--	--	14.37
	06/25/96	3.92	--	--	13.81
	12/11/96	1.47	--	--	16.26
	04/11/97	3.30	--	--	14.43
	10/27/97	4.38	--	--	13.35
	04/23/98	3.82	--	--	13.91
	04/06/99	3.09	--	--	14.64
	04/28/00	3.80	--	--	13.93
	05/07/01	4.02	--	--	13.71
	05/31/02	4.28	--	--	13.45
	06/04/03	3.94	--	--	13.79
	05/21/04	4.38	--	--	13.35
	08/25/05	4.98	--	--	12.75
	08/10/06	4.61	--	--	13.12
	09/06/07	5.05	--	--	12.68
	04/20/17	2.51	--	--	15.22
	09/26/17	4.60	--	--	13.13
	01/31/19	3.72	--	--	14.01
	02/28/19	3.30	--	--	14.43
	03/22/19	3.72	--	--	14.01
	04/29/19	3.72	--	--	14.01
	05/31/19	4.03	--	--	13.70
	06/28/19	4.27	--	--	13.46
	07/30/19	4.55	--	--	13.18
	08/29/19	4.79	--	--	12.94
	09/27/19	4.81	--	--	12.92
	10/28/19	4.98	--	--	12.75
	12/02/19	5.13	--	--	12.60
	12/30/19	4.33	--	--	13.40
MW-15 (25.01)	01/31/19	9.71	--	--	15.30
	02/28/19	8.40	--	--	16.61
	03/22/19	9.42	--	--	15.59
	04/29/19	8.63	--	--	16.38
	05/31/19	9.11	--	--	15.90
	06/28/19	9.80	--	--	15.21
	07/30/19	10.66	--	--	14.35
	08/29/19	11.40	--	--	13.61
	09/27/19	11.95	--	--	13.06
	10/28/19	12.37	--	--	12.64
	12/02/19	12.65	--	--	12.36
	12/30/19	11.34	--	--	13.67
MW-16 (22.56)	01/31/19	5.15	--	--	17.41
	02/28/19	4.58	--	--	17.98
	03/22/19	5.08	--	--	17.48
	04/29/19	5.05	--	--	17.51
	05/31/19	5.47	--	--	17.09
	06/28/19	5.72	--	--	16.84
	07/30/19	5.97	--	--	16.59
	08/29/19	6.21	--	--	16.35
	09/27/19	6.46	--	--	16.10
	10/28/19	6.69	--	--	15.87
	12/02/19	6.91	--	--	15.65
	12/30/19	6.20	--	--	16.36
MW-17 (22.57)	01/31/19	5.51	--	--	17.06
	02/28/19	4.98	--	--	17.59
	03/22/19	5.72	--	--	16.85
	04/29/19	5.68	--	--	16.89
	05/31/19	6.09	--	--	16.48
	06/28/19	6.52	--	--	16.05
	07/30/19	7.09	--	--	15.48
	08/29/19	7.52	--	--	15.05
	09/27/19	7.56	--	--	15.01
	10/28/19	7.82	--	--	14.75
	12/02/19	7.99	--	--	14.58
	12/30/19	6.59	--	--	15.98
MW-18 (23.09)	01/31/19	5.70	--	--	17.39
	02/28/19	4.93	--	--	18.16
	03/22/19	5.51	--	--	17.58
	04/29/19	5.73	--	--	17.36
	05/31/19	6.15	--	--	16.94
	06/28/19	6.75	--	--	16.34
	07/30/19	7.35	--	--	15.74
	08/29/19	7.84	--	--	15.25
	09/27/19	7.60	--	--	15.49
	10/28/19	7.82	--	--	15.27
	12/02/19	8.10	--	--	14.99
	12/30/19	6.29	--	--	16.80

Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-19 (17.03)	01/31/19	2.20	--	--	14.83
	02/28/19	1.60	--	--	15.43
	03/22/19	2.45	--	--	14.58
	04/29/19	2.60	--	--	14.43
	05/31/19	3.38	--	--	13.65
	06/28/19	3.82	--	--	13.21
	07/30/19	4.23	--	--	12.80
	08/29/19	4.58	--	--	12.45
	09/27/19	4.52	--	--	12.51
	10/28/19	4.50	--	--	12.53
	12/02/19	4.45	--	--	12.58
	12/30/19	2.77	--	--	14.26
MW-20 (21.86)	01/31/19	3.18	--	--	18.68
	02/28/19	2.60	--	--	19.26
	03/22/19	3.26	--	--	18.60
	04/29/19	3.25	--	--	18.61
	05/31/19	3.75	--	--	18.11
	06/28/19	4.45	--	--	17.41
	07/30/19	4.97	--	--	16.89
	08/29/19	5.48	--	--	16.38
	09/27/19	5.19	--	--	16.67
	10/28/19	5.62	--	--	16.24
	12/02/19	6.09	--	--	15.77
	12/30/19	4.05	--	--	17.81
MW-21 (21.92)	01/31/19	6.24	--	--	15.68
	02/28/19	3.76	--	--	18.16
	03/22/19	5.74	--	--	16.18
	04/29/19	5.94	--	--	15.98
	05/31/19	7.65	--	--	14.27
	06/28/19	8.62	--	--	13.30
	07/30/19	9.52	--	--	12.40
	08/29/19	10.17	--	--	11.75
	09/27/19	10.58	--	--	11.34
	10/28/19	11.00	--	--	10.92
	12/02/19	11.29	--	--	10.63
	12/30/19	9.94	--	--	11.98
MW-22 (21.86)	01/31/19	6.74	--	--	15.12
	02/28/19	3.48	--	--	18.38
	03/22/19	4.97	--	--	16.89
	04/29/19	5.10	--	--	16.76
	05/31/19	6.69	--	--	15.17
	06/28/19	7.96	--	--	13.90
	07/30/19	9.04	--	--	12.82
	08/29/19	9.78	--	--	12.08
	09/27/19	10.25	--	--	11.61
	10/28/19	10.66	--	--	11.20
	12/02/19	10.95	--	--	10.91
	12/30/19	10.14	--	--	11.72
MW-23 (22.32)	01/31/19	9.45	--	--	12.87
	02/28/19	7.65	--	--	14.67
	03/22/19	9.61	--	--	12.71
	04/29/19	8.20	--	--	14.12
	05/31/19	8.99	--	--	13.33
	06/28/19	10.29	--	--	12.03
	07/30/19	11.86	--	--	10.46
	08/29/19	12.53	--	--	9.79
	09/27/19	12.72	--	--	9.60
	10/28/19	13.13	--	--	9.19
	12/02/19	12.85	--	--	9.47
	12/30/19	11.06	--	--	11.26
MW-24 (27.88)	01/31/19	17.88	--	--	10.00
	02/28/19	15.88	--	--	12.00
	03/22/19	16.33	--	--	11.55
	04/29/19	13.28	--	--	14.60
	05/31/19	Well not found			
	06/28/19	Well not found			
	07/30/19	Well not found			
	08/29/19	18.65	--	--	9.23
	09/27/19	19.41	--	--	8.47
	10/28/19	19.43	--	--	8.45
	12/02/19	18.70	--	--	9.18
	12/30/19	18.30	--	--	9.58
MW-25 (26.71)	01/31/19	16.99	--	--	9.72
	02/28/19	15.30	--	--	11.41
	03/22/19	15.73	--	--	10.98
	04/29/19	12.11	--	--	14.60
	05/31/19	Well not found			
	06/28/19	16.40	--	--	10.31
	07/30/19	17.38	--	--	9.33
	08/29/19	17.85	--	--	8.86
	09/27/19	18.54	--	--	8.17
	10/28/19	18.60	--	--	8.11
	12/02/19	17.82	--	--	8.89
	12/30/19	17.32	--	--	9.39

Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-26 (21.61)	01/31/19	10.76	--	--	10.85
	02/28/19	7.51	--	--	14.10
	03/22/19	8.50	--	--	13.11
	04/29/19	7.10	--	--	14.51
	05/31/19	Well not found			
	06/28/19	9.33	--	--	12.28
	07/30/19	10.70	--	--	10.91
	08/29/19	11.60	--	--	10.01
	09/27/19	12.10	--	--	9.51
	10/28/19	12.33	--	--	9.28
	12/02/19	12.01	--	--	9.60
	12/30/19	9.93	--	--	11.68
MW-27 (25.37)	01/31/19	8.70	--	--	16.67
	02/28/19	7.07	--	--	18.30
	03/22/19	7.46	--	--	17.91
	04/29/19	7.42	--	--	17.95
	05/31/19	Well not found			
	06/28/19	8.79	--	--	16.58
	07/30/19	10.23	--	--	15.14
	08/29/19	11.27	--	--	14.10
	09/27/19	11.85	--	--	13.52
	10/28/19	12.22	--	--	13.15
	12/02/19	12.50	--	--	12.87
	12/30/19	11.62	--	--	13.75
MW-28 (20.11)	01/31/19	4.61	--	--	15.50
	02/28/19	4.95	--	--	15.16
	03/22/19	5.79	--	--	14.32
	04/29/19	4.19	--	--	15.92
	05/31/19	Well not found			
	06/28/19	7.08	--	--	13.03
	07/30/19	8.01	--	--	12.10
	08/29/19	8.45	--	--	11.66
	09/27/19	8.24	--	--	11.87
	10/28/19	8.20	--	--	11.91
	12/02/19	8.85	--	--	11.26
	12/30/19	5.94	--	--	14.17
MW-29 (20.44)	01/31/19	4.31	--	--	16.13
	02/28/19	3.83	--	--	16.61
	03/22/19	4.46	--	--	15.98
	04/29/19	4.52	--	--	15.92
	05/31/19	4.89	--	--	15.55
	06/28/19	5.11	--	--	15.33
	07/30/19	5.34	--	--	15.10
	08/29/19	5.54	--	--	14.90
	09/27/19	5.65	--	--	14.79
	10/28/19	5.80	--	--	14.64
	12/02/19	5.94	--	--	14.50
	12/30/19	5.05	--	--	15.39
MW-30 (25.41)	01/31/19	15.62	--	--	9.79
	02/28/19	14.99	--	--	10.42
	03/22/19	14.76	--	--	10.65
	04/29/19	10.88	--	--	14.53
	05/31/19	11.22	--	--	14.19
	06/28/19	14.29	--	--	11.12
	07/30/19	15.96	--	--	9.45
	08/29/19	16.18	--	--	9.23
	09/27/19	17.33	--	--	8.08
	10/28/19	17.34	--	--	8.07
	12/02/19	16.55	--	--	8.86
	12/30/19	16.01	--	--	9.40
MW-31 (23.64)	01/31/19	10.20	--	--	13.44
	02/28/19	8.73	--	--	14.91
	03/22/19	10.91	--	--	12.73
	04/29/19	8.22	--	--	15.42
	05/31/19	8.92	--	--	14.72
	06/28/19	12.00	--	--	11.64
	07/30/19	13.47	--	--	10.17
	08/29/19	14.26	--	--	9.38
	09/27/19	14.66	--	--	8.98
	10/28/19	14.92	--	--	8.72
	12/02/19	14.54	--	--	9.10
	12/30/19	12.87	--	--	10.77

¹Please refer to notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL) ¹	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-32 (25.62)	01/31/19	15.80	--	--	9.82
	02/28/19	15.44	--	--	10.18
	03/22/19	15.59	--	--	10.03
	04/29/19	11.45	--	--	14.17
	05/31/19	11.44	--	--	14.18
	06/28/19	15.42	--	--	10.20
	07/30/19	16.59	--	--	9.03
	08/29/19	16.98	--	--	8.64
	09/27/19	17.66	--	--	7.96
	10/28/19	17.66	--	--	7.96
	12/02/19	16.85	--	--	8.77
	12/30/19	16.21	--	--	9.41
MW-33 (25.34)	01/31/19	15.11	--	--	10.23
	02/28/19	14.51	--	--	10.83
	03/22/19	14.77	--	--	10.57
	04/29/19	10.70	--	--	14.64
	05/31/19	11.01	--	--	14.33
	06/28/19	14.41	--	--	10.93
	07/30/19	15.90	--	--	9.44
	08/29/19	16.40	--	--	8.94
	09/27/19	17.06	--	--	8.28
	10/28/19	17.12	--	--	8.22
	12/02/19	16.75	--	--	8.59
	12/30/19	15.78	--	--	9.56
DW-1 (23.47)	07/19/18	14.00	--	--	9.47
	01/31/19	14.06	--	--	9.41
	03/22/19	12.73	--	--	10.74
	04/29/19	9.97	--	--	13.50
	05/31/19	9.45	--	--	14.02
	06/28/19	14.25	--	--	9.22
	07/30/19	14.87	--	--	8.60
	08/29/19	14.31	--	--	9.16
	09/27/19	15.89	--	--	7.58
	10/28/19	15.44	--	--	8.03
	12/02/19	14.60	--	--	8.87
	12/30/19	14.04	--	--	9.43
DW-2 (20.76)	07/19/18	10.95	--	--	9.81
	01/31/19	10.92	--	--	9.84
	03/22/19	9.81	--	--	10.95
	04/29/19	7.20	--	--	13.56
	05/31/19	6.86	--	--	13.90
	06/28/19	11.03	--	--	9.73
	07/30/19	12.01	--	--	8.75
	08/29/19	11.85	--	--	8.91
	09/27/19	12.85	--	--	7.91
	10/28/19	12.48	--	--	8.28
	12/02/19	11.64	--	--	9.12
	12/30/19	11.18	--	--	9.58
DW-3 (20.41)	07/19/18	10.71	--	--	9.70
	01/31/19	10.61	--	--	9.80
	03/22/19	9.54	--	--	10.87
	04/29/19	6.96	--	--	13.45
	05/31/19	6.67	--	--	13.74
	06/28/19	10.74	--	--	9.67
	07/30/19	11.56	--	--	8.85
	08/29/19	11.50	--	--	8.91
	09/27/19	12.50	--	--	7.91
	10/28/19	12.08	--	--	8.33
	12/02/19	11.45	--	--	8.96
	12/30/19	10.89	--	--	9.52
PDX QTA	07/18/18	16.90	--	--	NS

Notes:

1. feet MSL = Feet above mean sea level.
2. Casing elevations and groundwater data prior to December 1996 are from a Draft Quarterly Groundwater Monitoring Report dated December 12, 1996, and prepared by Geraghty & Miller.
3. Groundwater data prior to August 2005 were identified from previous report tables and could not be verified by field logs.
4. NM = Water level not measured. NS = Well not surveyed
5. -- = No product.
6. Elevation was corrected in wells with the presence of measurable separate-phase petroleum hydrocarbons using the following equation and assuming a specific gravity for gasoline product of 0.8 gram per cubic centimeter (Merck, 1989):

$$h_w = \frac{\rho_p h_p}{\rho_w}$$

water-level elevation = top of casing elevation + [h_w - d_w]

where:

h_w = depth to groundwater correction ρ_w = density of water
d_w = depth to groundwater measuring point h_p = product thickness
ρ_p = density of separate-phase hydrocarbons

Reference: Merck Index 1989, An Encyclopedia of Chemicals, Drugs and Biologicals,
Merck and Company, Rahway, New Jersey.

Table 3
Groundwater Field Parameters
Fire Training Facilities
Portland International Airport
Portland, Oregon

Well ID	Sampling Date	pH	Temp (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)
MW-1	11/8/2019	6.21	16.2	244.4	0.20	61.0
MW-3	11/8/2019	6.12	16.3	352.7	0.22	79.8
MW-4	11/8/2019	6.23	16.7	404.9	0.21	28.7
MW-8	11/8/2019	6.21	16.0	594	0.21	33.2
MW-10A	11/8/2019	5.74	16.1	229.1	0.22	81.4
MW-14	11/8/2019	6.03	15.9	86.7	4.11	57.9
MW-15	11/8/2019	6.34	15.3	460.6	0.23	53.5
MW-16	11/7/2019	6.00	14.8	100.3	0.28	75.3
MW-17	11/7/2019	6.1	13.8	179.3	0.28	67.8
MW-18	11/7/2019	5.88	15.3	113.4	0.99	96.3
MW-19	11/7/2019	6.07	15.2	234.9	0.83	59.6
MW-20	11/7/2019	6.46	16.5	118.6	8.09	83.0
MW-21	11/7/2019	6.23	14.3	274.7	0.26	71.5
MW-22	11/7/2019	6.28	13.7	230.2	0.41	55.5
MW-23	11/7/2019	6.01	13.5	184.6	1.96	83.9
MW-24	11/6/2019	6.6	11.8	263.6	6.45	70.4
MW-25	11/6/2019	6.6	11.9	212.8	1.95	-9.0
MW-26	11/6/2019	6.5	13.2	612	1.52	-10.8
MW-27	11/7/2019	6.00	15.5	406.8	0.27	38.2
MW-28	11/6/2019	6.5	14.1	1,446	1.36	-82.3
MW-29	11/6/2019	6.6	15.7	127.6	0.48	-76.7
MW-30	11/6/2019	6.3	13.9	201.3	3.87	40.3
MW-31	11/6/2019	6.3	14.8	283.2	1.49	5.4
MW-32	11/6/2019	6.5	14.9	252.6	5.06	38.7
MW-33	11/7/2019	5.30	13.1	160.8	1.93	162.2
DW-1	11/6/2019	6.5	14.2	482.3	0.88	-42.4
DW-2	11/8/2019	6.39	14.1	526	0.26	49.7
DW-3	11/6/2019	6.5	14.7	349.3	0.72	-54.3

Notes:

1. °C = Degrees Celsius.
2. µS/cm = Microsiemens per centimeter.
3. ORP = Oxidation-reduction potential.
4. mg/L (ppm) = Milligrams per liter (parts per million).
5. mV = Millivolts.
6. -- = Parameter not recorded.

Table 4
Stormwater and Surface Water Analytical Results – PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTTrDA	PFTTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	
		Concentrations in ng/L																								
Risk-Based Screening Level	Recreational	--	--	--	--	--	--	--	--	1,200	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	Construction Worker	--	--	--	--	--	--	--	--	5,300	220	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	Aquatic Organisms - Chronic	--	--	--	--	--	--	--	--	140,000	880,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MH-1	8/29/2017	86.3	--	--	--	852 H	1,170 H	--	425	6,610 H	1,220	--	118	--	9.95	<2.16	<2.16	<2.16	<2.16	<2.16	<2.16	--	--	--	--	
MH-2	8/29/2017	5.06	--	--	--	21.5 H	304 H	--	174	28.0 H	175	--	13.6	--	<2.32	<2.32	<2.32	<2.32	<2.32	<2.32	<2.32	--	--	--	--	
MH-3	6/19/2018	1.18	--	--	--	3.82	549	--	158	2.06	45.2	--	3.85	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	
MH-4	6/19/2018	<1.00	--	--	--	2.98	19.9	--	9.04	<1.00	6.12	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	
OF1N-NW	DUP	8/29/2017	33.6	--	--	--	352 H	357 H	--	132	2,650 H	441	--	39.6	--	<2.17	<2.17	<2.17	<2.17	<2.17	<2.17	<2.17	--	--	--	--
		6/20/2018	<1.00	--	--	--	<1.00	<1.00	--	<1.00	2.47	2.15	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
		6/20/2018	<1.00	--	--	--	<1.00	1.62	--	<1.00	2.12	1.95	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
		2/6/2019	13.5	--	--	--	117	140	--	69.4	299	193	--	15.0	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
		5/2/2019	18.1	--	--	--	105	259	--	171	552	267	--	16.9	--	<1.02	<1.02	<1.02	<1.02	<1.02	<2.03	<1.02	--	--	--	--
		8/9/2019	30.5	88.2	38.4	337	265	331	7.40	132	960	356	142 Q	23.9	<1.06	2.55	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	6.84	1,820	137
		11/8/2019	13.6	52.7	19.8	190	117	141	3.19	66.0	302	147	<2.13	8.28	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	4.81	1,060	44.5
SW-1	8/29/2017	111	--	--	--	2,180 H	450 H	--	351	14,500 H	1,110	--	482	--	10.3	<2.23	<2.23	<2.23	<2.23	<2.23	<2.23	--	--	--	--	
SW-2	9/27/2017	11.3	--	--	--	113	97.6	--	47	545	131	--	21.4	--	3.96	1.78	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--	
	5/15/2018	10.2	--	--	--	84.9	126	--	55.6	324	140	--	9.35	--	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	--	--	--	--	
	2/6/2019	9.74	--	--	--	92.5	139	--	63.6	263	150	--	12.6	--	1.32	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	
	5/2/2019	12.3	--	--	--	65.6	167	--	106	291	164	--	11.1	--	<1.03	<1.03	<1.03	<1.03	<1.03	<2.07	<1.03	--	--	--	--	
	8/9/2019	19.7	71.4	24.8	283	210	296	5.98	109	554	273	<1.01	21.9	<1.01	1.93	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	3.62	1,090	49.1	
	11/8/2019	3.90	14.9	4.01	50.2	22.2	33.3	<2.14	19.4	90.2	37.7	<2.14	7.79	<2.14	3.28	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	57.4	12.9	
SW-3	9/27/2017	8.51	--	--	--	54	63.1	--	27	323	76.8	--	12.6	--	3.5	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	
	5/15/2018	12.0	--	--	--	97.5	124	--	52.2	270	142	--	9.53	--	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	--	--	--	--	
	2/6/2019	9.16	--	--	--	70.6	122	--	53.1	282	133	--	11.5	--	1.10	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	
	5/2/2019	6.04	--	--	--	27.3	65.6	--	43.2	115	67.2	--	4.65	--	<1.02	<1.02	<1.02	<1.02	<1.02	<2.04	<1.02	--	--	--	--	
	8/9/2019	12.2	49.1	13.6	209	105	189	4.53	67.4	314	158	<1.02	16.7	<1.02	1.60	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	1.38	339	8.48	
	11/8/2019	9.44	27.9	9.59 Q	121	56.9	83.7	<2.18	41.1	141	93.8	<2.18	10.3	<2.18	5.19 Q	<2.18	<2.18	<2.18	<2.18	<2.18	<2.18	<2.18	<2.18	240	16.3	
Ditch B	5/2/2019	1.31	--	--	--	2.68	5.14	--	3.19	<1.01	12.2	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--		

- Notes:
1. ng/L = Nanograms per liter (ppt [parts per trillion]).
 2. Bold values indicate the compounds was detected above laboratory reporting limits.
 3. < = Compound not detected at or above laboratory reporting limit shown.
 4. H = Sample was extracted outside of the EPA 537 recommended holding time of 14 days.
 5. Q = Identification of analyte could not be confirmed. Ion ratio exceeded control limit.
 6. Screening levels from State of Maine (Recreational) and State of Michigan (Aquatic Organisms). See Table A-7.
 7. Shading indicates concentration of analyte exceeded the screening level for construction worker.
 8. -- = Value not available.

PFBS	Perfluorobutanesulfonic acid (C4)	PFNS	Perfluorononane sulfonic acid (C9)	Perfluoroocta	PFOSA
PFBA	Perfluorobutanoic acid (C4)	PFNA	Perfluorononanoic acid (C9)	Fluorotelome	4:2 FTS
PFPeS	Perfluoropentane sulfonic acid (C5)	PFDS	Perfluorodecane sulfonic acid (C10)	Fluorotelome	6:2 FTS
PFPeA	Perfluoropentanoic acid (C5)	PFDA	Perfluorodecanoic acid (C10)	Fluorotelome	8:2 FTS
PFHxS	Perfluorohexanesulfonic acid (C6)	PFUnA	Perfluoroundecanoic acid (C11)		
PFHxA	Perfluorohexanoic acid (C6)	PFDoA	Perfluorododecanoic acid (C12)		
PFHpS	Perfluoroheptane sulfonic acid (C7)	PFTTrDA	Perfluorotridecanoic acid (C13)		
PFHpA	Perfluoroheptanoic acid (C7)	PFTTeDA	Perfluorotetradecanoic acid (C14)		
PFOS	Perfluorooctanesulfonic acid (C8)	MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)		
PFOA	Perfluorooctanoic acid (C8)	EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)		

Table 5
Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl- PF3OUdS	9Cl- PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
Screening Level		400,000	71,000	1,000	93	93	300	560	70	--	290	290	370	290	290	290	290	290	--	--	290	--	200	200	--	--	--	140	
MW-1	4/20/2017	60.2	--	--	--	1,190	461	--	188	8,680	1,050	--	134	--	15.1	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	--	--	--	--	--	--	--	--
	2/5/2019	60.0	--	--	--	1,120	379	--	255	10,100	936	--	150	--	8.20	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/2/2019	53.8	--	--	--	1,000	345	--	210	10,600	833	--	127	--	9.77	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	8/8/2019	51.1	116	80.3	345	919	354	80.0	206	8,040	723	9.48	113	<1.06	8.83	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	18.3	<1.06	234	506	--	--	--	--
	11/8/2019	50.0	118	78.0	338	778	283	42.0	182	5,340	729	2.20 Q	88.7	<2.05	5.70 Q	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	13.3	<2.05	261	413	--	--	--	--
MW-3	4/20/2017	255	--	--	--	4,210	1,640	--	676	23,700	5,820	--	182	--	8.41	<1.82	<1.82	<1.82	<1.82	<1.82	<1.82	--	--	--	--	--	--	--	--
	2/5/2019	206	--	--	--	3,740	1,220	--	581	14,900	4,640	--	117	--	12.3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/2/2019	116	--	--	--	2,690	4,650	--	1,020	25,200	4,270	--	164	--	24.6	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	8/8/2019	138	508	249	3,200	2,950	2,860	532	861	19,200	4,760	5.54 Q	166	<1.06	21.6	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	1.18	395	67,100 J	1,200	--	--	--	--
	11/8/2019	159	1,420	275	9,400	3,230	6,240	442	1,800	17,200	5,450	5.61	170	<2.13	57.1	4.33	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	595	898	1,850	--	--	--	--
MW-4	4/20/2017	5,580	--	--	--	23,900	30,400	--	7,130	203,000	9,930	--	<472	--	12.2	<1.84	<1.84	<1.84	<1.84	<1.84	<1.84	--	--	--	--	--	--	--	--
	9/26/2017	5,600	--	--	--	24,000	36,000	--	9,500	92,000	10,000	--	<500	--	<500	<500	<500	<500	--	--	--	--	--	--	--	--	--	--	--
	2/6/2019	3,280	--	--	--	13,500	19,700	--	6,720	85,000	10,400	--	360	--	11.8	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	2/6/2019	3,580	--	--	--	19,500	15,100	--	637	111,000	6,710	--	370	--	10.8	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/2/2019	4,380	--	--	--	18,100	16,600	--	7,870	137,000	7,910	--	334	--	12.9	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/2/2019	3,610	--	--	--	14,800	17,200	--	8,220	121,000	8,250	--	349	--	11.4	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--
	8/8/2019	3,440	7,350	5,100	27,800	20,600	32,100	976	8,620	73,600	9,390	<249	346	<249	<249	<249	<249	<249	<249	<249	<249	958	154,000	3,590	<249	<249	<249	<312	
	8/8/2019	5,690	8,260	8,220	23,400	30,700	22,900	1,030	8,420	110,000	6,370	3.32	310	<1.02	10.7	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	1,550	157,000	5,670	--	--	--	--
	11/8/2019	3,600	8,220	5,440	31,300	28,900	11,600	3,770	10,700	36,200	9,940	<2.10	369	<2.10	10.8	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	968	1,400	7,610	--	--	--	--
	DUP	11/8/2019	3,550	8,940	5,290	32,800	25,200	11,700	4,780	11,000	77,400	9,050	109 Q	343	<2.06	10.8	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	974	15,700	6,090	--	--	--
MW-6	9/26/2017	11	--	--	--	459	338	--	240	1,080	383	--	149	--	11.3	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--	--	--	--	--
	9/26/2017	12.1	--	--	--	456	351	--	249	1,160	439	--	158	--	10.4	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
MW-7	4/20/2017	154	--	--	--	495	1,280	--	505	2,710	476	--	76.5	--	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	--	--	--	--	--	--	--	--
	DUP	4/20/2017	137	--	--	589	1,100	--	434	819	568	--	83.9	--	2.27	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	--	--	--	--	--	--	--	--
MW-8	9/26/2017	62.7	--	--	--	66.6	428	--	30.1	130	165	--	9.95	--	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	--	--	--	--	--	--	--	--
	2/5/2019	46.6	--	--	--	485	390	--	154	263	225	--	39.3	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/2/2019	47.2	--	--	--	279	378	--	102	229	215	--	37.4	--	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--	--	--	--	--
	8/8/2019	69.6	197	12.0	248	65.2	486	<1.07	38.4	132	186	<1.07	8.77	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	2.37	15.8	1.95	--	--	--	--
	11/8/2019	60.4	206	43.1	453	457	373	6.01	163	237	465	<2.03	25.9	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	3.15	44.9	<2.03	--	--	--	--
MW-9	4/20/2017	90.7	--	--	--	1,910	460	--	99.4	1,360	7,880	--	24.8	--	26.8	<1.78	<1.78	<1.78	<1.78	<1.78	<1.78	--	--	--	--	--	--	--	--
MW-10A	4/21/2017	35.8	--	--	--	1,040	363	--	193	342	30,900	--	43.7	--	21.8	<1.83	<1.83	<1.83	<1.83	<1.83	<1.83	--	--	--	--	--	--	--	--
	2/5/2019	72.5	--	--	--	909	435	--	112	241	5,220	--	12.1	--	11.6	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/2/2019	47.0	--	--	--	995	382	--	105	314	5,640	--	18.6	--	11.4	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--
	8/8/2019	147	143	102	397	1,940	1,010	9.06	196	714	7,290	<1.07	24.1	<1.07	26.0	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	185	2.10	--	--	--
	11/8/2019	190	122	87.7	337	1,090	766	8.46	154	503	4,810	<2.04	14.3	<2.04	14.9	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	32.9	3.84	--	--	--	--
MW-13	9/26/2017	10.9	--	--	--	301	750	--	475	1,040	717	--	394	--	29.5	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
MW-14	9/26/2017	9.26	--	--	--	157	73.1	--	59.5	1,710	98.8	--	66	--	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	--	--	--	--
	2/5/2019	34.4	--	--	--	283	154	--	67.7	550	95.1	--	40.2	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	4/29/2019	23.2	--	--	--	388	97.6	--	61.1	468	80.0	--	39.7	--	<1.00	<1.00	<1.00	<1.00	<1.00										

Table 5
Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
Screening Level		400,000	71,000	1,000	93	93	93	300	560	70	--	290	290	370	290	290	290	290	290	--	--	290	--	200	200	--	--	--	140
MW-19	2/6/2019	<1.00	--	--	--	9.61	2.78	--	1.69	29.3	5.09	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/1/2019	<1.01	--	--	--	6.59	2.01 Q	--	1.30	18.7	4.18	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	8/7/2019	1.18	2.36	1.48	1.97	10.9	2.06	<1.06	2.16 Q	30.4	3.50	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--
	11/7/2019	<2.13	4.26	<2.13	2.96	11.3	3.64	<2.13	<2.13	42.0	6.03	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	--	--	--	--
MW-20	2/4/2019	<1.00	--	--	--	3.79	<1.08	--	1.02 Q	21.1	2.33	--	1.37 Q	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/1/2019	9.37	--	--	--	52.1	<1.01	--	1.34 Q	9.23	3.46	--	1.38 Q	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	8/7/2019	8.63	7.71	9.89	2.82	57.8	8.47	<1.02	7.38	13.6	10.6	<1.02	1.96	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	--	--	--
	11/7/2019	4.21	2.64	2.46	<2.03	15.9	2.13 Q	<2.03	2.28	33.9	6.11	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	--	--	--
MW-21	2/4/2019	1.40	--	--	--	4.77	<1.11	--	<1.00	1.65 Q	1.93	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/1/2019	1.31	--	--	--	3.95	<1.01	--	<1.01	<1.01	2.32	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	8/7/2019	1.36	<1.07	<1.07	<1.07	5.27	<1.07	<1.07	<1.07	1.15 Q	1.45	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--
	11/7/2019	<2.12	<2.12	<2.12	<2.12	5.14 Q	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	--	--	--
MW-22	2/4/2019	<1.00	--	--	--	<1.00	<1.09	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/1/2019	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	8/7/2019	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--
	11/7/2019	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	--	--	--
MW-23	2/4/2019	4.95	--	--	--	26.8	<1.11	--	<1.00	9.01 Q	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/1/2019	3.30	--	--	--	16.2	<1.00	--	<1.00	5.19 Q	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	8/7/2019	4.40	<1.05	5.07	<1.05	22.3	<1.05	<1.05	<1.05	5.49	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--
	11/7/2019	5.17	<2.02	5.47	<2.02	24.5	<2.02	<2.02	<2.02	6.98 Q	2.35	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	--	--	--
MW-24	2/1/2019	<1.00	--	--	--	<1.00	<1.08	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	4/30/2019	<1.01	--	--	--	<1.01	<1.01	--	<1.01	<1.01	<1.01	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	8/9/2019	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	--	--	--
	11/7/2019	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	--	--	--
MW-25	2/1/2019	<1.00	--	--	--	<1.00	<1.13	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	4/30/2019	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	8/7/2019	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--
	11/6/2019	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	--	--	--
MW-26	2/1/2019	17.6	--	--	--	81.2	125	--	89.5	1.45 Q	354	--	1.89	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	4/30/2019	21.0	--	--	--	110	129	--	88.4	<1.00	292	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	8/7/2019	22.1	49.9	16.0	147	106	147	<1.00	93.0	1.81 Q	302	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.25
	11/6/2019	23.7	67.3	16.7	205	93.8	173	<2.04	110	<2.04	323	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	--	--	--
MW-27	2/4/2019	<1.00	--	--	--	<1.00	<1.14	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/1/2019	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	8/8/2019																												

Table 5
Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl- PF3OUdS	9Cl- PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
Screening Level		400,000	71,000	1,000	93	93	93	300	560	70	--	290	290	370	290	290	290	290	290	--	--	290	--	200	200	--	--	--	140
MW-33	2/4/2019	<1.00	--	--	--	3.60	1.62	--	1.44 Q	<1.00	3.16	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/1/2019	1.18	--	--	--	7.93	2.17	--	2.33	<1.01	5.69	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	8/8/2019	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	11/7/2019	<2.03	2.55	<2.03	3.79	10.6	<2.03	<2.03	2.38	<2.03	6.54	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	--	--	--	--
B-A-GW	9/27/2017	4.57	--	--	--	23.9	13.0	--	13.3	1.70 J+	32.9	--	<1.06	--	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-B-GW	9/27/2017	<1.05	--	--	--	<1.05	<1.05	--	<1.05	2.29 J+	1.31 J+	--	<1.05	--	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--	--	--	--	--
B-C-GW	9/27/2017	<1.05	--	--	--	<1.05	<1.05	--	<1.05	3.77 J+	1.43 J+	--	<1.05	--	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--	--	--	--	--
B-D-GW	9/27/2017	15.7	--	--	--	112	38.2	--	24.6	4.73 J+	93.6	--	1.87	--	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
B-E-GW	9/27/2017	8.04	--	--	--	85.4	3,220	--	1,310	17.2	1,020	--	208	--	1.99	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	--	--	--	--	--	--	--	--
B-F-GW	8/29/2017	21.8	--	--	--	347 H	11,100 H	--	5,240	138 H	5,410	--	5,070	--	22.7	<2.17	<2.17	<2.17	<2.17	<2.17	<2.17	--	--	--	--	--	--	--	--
B-G-GW	8/29/2017	27.2	--	--	--	200 H	14,400 H	--	5,860	56.2 H	5,410	--	772	--	14.5	<2.25	<2.25	<2.25	<2.25	<2.25	<2.25	--	--	--	--	--	--	--	--
B-H-GW	9/28/2017	<1.11	--	--	--	18.4	3,640	--	738	34.6	8,810	--	3.35	--	1.23	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	--	--	--	--	--	--	--	--
B-I-GW	9/28/2017	12.7	--	--	--	254	81.2	--	57.3	3,150	80	--	194	--	14.3	1.52	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	--	--	--	--
B-J-GW	9/28/2017	16.1	--	--	--	763	377	--	282	3,330	524	--	350	--	19.6	1.51	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--	--	--	--	--
B-K-GW	9/28/2017	16.7	--	--	--	317	72	--	57.9	513	221	--	33.6	--	1.59	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-L-GW	9/28/2017	<1.09	--	--	--	<1.09	<1.09	--	2.32	2.01 J+	20.7	--	<1.09	--	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
B-N-GW	8/29/2017	7.19	--	--	--	83.4 H	2.75 H	--	<2.12	2.84 J+, H	<2.12	--	<2.12	--	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	--	--	--	--	--	--	--	--
B-O-GW	8/29/2017	5.92	--	--	--	67.0 H	19.5 H	--	<2.13	20.8 H	396	--	<2.13	--	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	--	--	--	--	--	--	--	--
B-P-GW	8/28/2017	<2.15	--	--	--	44.5 H	17.9 H	--	9.78	4.87 J+, H	149	--	<2.15	--	<2.15	<2.15	<2.15	<2.15	<2.15	<2.15	<2.15	--	--	--	--	--	--	--	--
B-Q-GW	8/28/2017	<2.20	--	--	--	7.61 H	11.1 H	--	4.21	6.09 J+, H	27.2	--	<2.20	--	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20	--	--	--	--	--	--	--	--
B-R-GW	8/28/2017	<2.13	--	--	--	4.82 H	3.88 H	--	<2.13	18.8 H	12.3 J+	--	<2.13	--	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	--	--	--	--	--	--	--	--
B-S-GW	8/28/2017	<2.12	--	--	--	3.90 H	6.28 H	--	<2.12	2.25 J+, H	5.36 J+	--	<2.12	--	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	--	--	--	--	--	--	--	--
B-T-GW	8/29/2017	<2.20	--	--	--	2.52 H	2.75 H	--	<2.20	2.69 J+, H	<2.20	--	<2.20	--	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20	--	--	--	--	--	--	--	--
B-U-GW	8/29/2017	<2.12	--	--	--	<2.40 H	3.02 H	--	<2.12	2.51 J+, H	<2.12	--	<2.12	--	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	--	--	--	--	--	--	--	--
B-V-GW	9/29/2017	14.1	--	--	--	96.5	40.6	--	38.4	27.5	234	--	7.55	--	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	--	--	--	--	--	--	--	--
B-W-GW	9/29/2017	<1.08	--	--	--	<1.08	<1.08	--	<1.08	<1.08	1.83 J+	--	<1.08	--	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	--	--	--	--
B-X-GW	9/29/2017	20	--	--	--	169	114	--	106	13.7	204	--	3.46	--	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	--	--	--	--
B-1	6/12/2018	<1.03	--	--	--	<1.03	<1.03	--	<1.03	1.39	1.38	--	<1.03	--	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--
B-2	6/13/2018	7.2	--	--	--	42.7	58.2	--	33.1	3	608	--	2.61	--	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-3	6/12/2018	20.2	--	--	--	178	191	--	136	7.71	480	--	8.18	--	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--
B-4	6/13/2018	23.5	--	--	--	226	140	--	128	21	1,300	--	14.9	--	1.74	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-5 DUP	6/18/2018	69.7	--	--	--	460	1,040	--	1,140	4.38	4,500	--	32.4	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--
	6/18/2018	62	--	--	--	466	1,080	--	1,120	3.50	4,410	--	33.9	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--
B-6 DUP	6/18/2018	4.04	--	--	--	31.7	43.8	--	45	1.03	262	--	1.87	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--
	6/18/2018	3.93	--	--	--	35.3	39.6	--	42.6	<1.00	231	--	1.75	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--
B-7	6/12/2018	<1.01	--	--	--	8.75	6.77	--	4.78	<1.01	17	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
B-8	6/12/2018	2.88	--	--	--	52.7	<1.15	--	<1.15	25.8	6.53	--	<1.15	--	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	--	--	--	--	--	--	--	--
B-9	6/12/2018	3.48	--	--	--	37.4	19.1	--	14.7	28.6	55.5	--	<1.02	--	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	--	--	--	--	--	--	--	--
B-10	6/11/2018	<1.00 H	--	--	--	<1.00 H	<1.17 H	--	<1.00 H	<1.00 H	<1.00 H	--	<1.00 H	--	<1.00 H	<1.00 H	<1.00 H	<1.00 H	<1.00 H	<1.00 H	<1.00 H	--	--	--	--	--	--	--	--
B-11	6/11/2018	<1.06	--	--	--	2.14	<1.06	--	<1.06	<1.06	1.35	--	<1.06	--	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-12	6/11/2018	<1.04	--	--	--	1.86	<1.04	--	<1.04	<1.04	1.08	--	<1.04	--	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	--	--	--	--	--	--	--	--
B-13	6/11/2018	<1.09	--	--	--	<1.09	<1.09	--	<1.09	<1.09	<1.09	--	<1.09	--	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
B-14	6/11/2018	<1.09	--	--	--	<1.09	6.48	--	3.71	<1.09	3.49	--	<1.09	--	<1.09	<1.09	<1.09	<1.09	<1.09	<									

Please refer to notes at end of table.

Table 5
Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	¹¹ Cl- PF3OUdS	⁹ Cl- PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
Screening Level		400,000	71,000	1,000	93	93	93	300	560	70		--	290	290	370	290	290	290	290	--	--	290	--	200	200	--	--	--	140

- Notes:
1. ng/L = Nanograms per liter (ppt [parts per trillion]).
 2. Bold values indicate the compounds was detected above laboratory reporting limits.
 3. < = Compound not detected at or above laboratory reporting limit shown.
 4. J = The reported concentration is an estimated value.
 5. J+ = Data results are estimated and may be biased high.
 6. H = Sample was extracted outside of the EPA 537 recommended holding time of 14 days.
 7. UJ = The not detected result is estimated due to estimation of reporting limit.
 8. D = The RPD between the primary and field duplicate sample exceeded the 30% control limit. Issues with precision are suspected.
 9. Q = Identification of analyte could not be confirmed. Ion ratio exceeded control limit.
 10. Screening level is residential drinking water: Health advisory limit from the United States Environmental Protection Agency (U.S. EPA) for combined PFOA and PFOS; EPA RSL (THQ=1) for PFBS; Health Canada for 6:2 FTS and 8:2 FTS; German Ministry of Health for PFPeS and PFHpS; State of North Carolina for GenX; and State of Texas for remainder. See Table A-7.
 11. -- = Value not available.
 12. Sample locations with "MW" in the ID are permanent monitoring wells. Sample locations with "B" in the ID were collected from temporary boring locations.
 13. Shading indicates concentration of analyte was detected above the screening level.

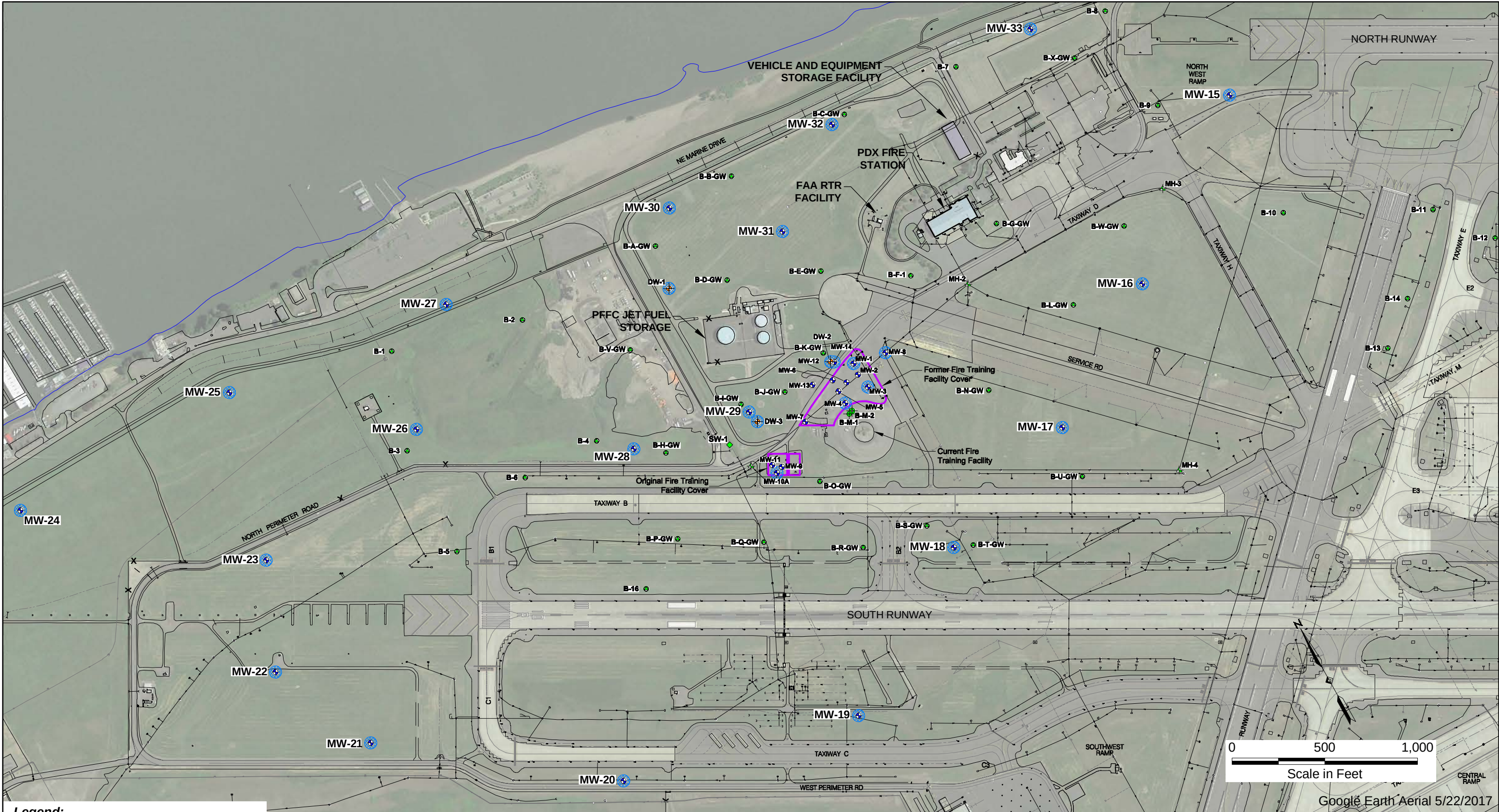
PFBS	Perfluorobutanesulfonic acid (C4)	PFNS	Perfluorononane sulfonic acid (C9)	PFOSA	Perfluorooctane sulfonamide (C8)
PFBA	Perfluorobutanoic acid (C4)	PFNA	Perfluorononanoic acid (C9)	4:2 FTS	Fluorotelomer sulfonate (C4)
PFPeS	Perfluoropentane sulfonic acid (C5)	PFDS	Perfluorodecane sulfonic acid (C10)	6:2 FTS	Fluorotelomer sulfonate (C6)
PFPeA	Perfluoropentanoic acid (C5)	PFDA	Perfluorodecanoic acid (C10)	8:2 FTS	Fluorotelomer sulfonate (C8)
PFHxS	Perfluorohexanesulfonoic acid (C6)	PFUnA	Perfluoroundecanoic acid (C11)	11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B)
PFHxA	Perfluorohexanoic acid (C6)	PFDoA	Perfluorododecanoic acid (C12)	9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)
PFHpS	Perfluoroheptane sulfonic acid (C7)	PFTTrDA	Perfluorotridecanoic acid (C13)	ADONA	4,8-Dioxa-3H-perfluorononanoate
PFHpA	Perfluoroheptanoic acid (C7)	PFTeDA	Perfluorotetradecanoic acid (C14)	HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (GenX)
PFOS	Perfluorooctanesulfonic acid (C8)	MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)		
PFOA	Perfluorooctanoic acid (C8)	EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)		

Table 6
Groundwater Analytical Results – Upper CRSA Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS
		Concentrations in ng/L																							
Screening Level		400,000	71,000	1,000	93	93	93	300	560	70	--	290	290	370	290	290	290	290	--	--	290	--	200	200	
M-GW-1 (40")	10/3/2017	61.0	--	--	--	268	223	--	48.2	963	61.5	--	2.50	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
M-GW-2 (61.5')	10/3/2017	10.1	--	--	--	29.0	32.3	--	6.77	60.5	9.34	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
DW-1	7/19/2018	<1.00	--	--	--	<1.00	<1.09	--	<1.00	1.65	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	2/1/2019	<1.00	--	--	--	<1.00	<1.04	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	4/30/2019	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	8/6/2019	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01
	11/6/2019	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02
DW-2	7/19/2018	<1.00	--	--	--	<1.00	<1.05	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	2/5/2019	<1.00	--	--	--	<1.00	<1.04	--	<1.00	1.14 Q	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	4/29/2019	<1.01	--	--	--	<1.01	<1.01	--	<1.01	1.28	<1.01	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--
	8/6/2019	<1.00	<1.00	<1.00	1.28	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	11/8/2019	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06
DW-3	7/19/2018	<1.00	--	--	--	2.08	1.92	--	<1.00	85.5	1.85	--	1.50	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	2/1/2019	<1.00	--	--	--	<1.00	<1.06	--	<1.00	10.8	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	5/1/2019	<1.01	--	--	--	<1.01	<1.01	--	<1.01	3.15	<1.01	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	--	--	--	--
	8/6/2019	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	7.18	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	1.02
	11/6/2019	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	3.47	<2.14	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13

- Notes:
1. ng/L = Nanograms per liter (ppt [parts per trillion]).
 2. Bold values indicate the compounds was detected above laboratory reporting limits.
 3. < = Compound not detected at or above laboratory reporting limit shown.
 4. Screening level is residential drinking water: Health advisory limit from the United States Environmental Protection Agency (U.S. EPA) for combined PFOA and PFOS; EPA RSL (THQ=1) for PFBS; Health Canada for 6:2 FTS and 8:2 FTS; German Ministry of Health for PFPeS and PFHpS; State of North Carolina for GenX; and State of Texas for remainder. See Table A-7.
 5. -- = Value not available.
 6. Q = Identification of analyte could not be confirmed. Ion ratio exceeded control limit.
 7. Shading indicates concentration of analyte was detected above the screening level.

PFBS	Perfluorobutanesulfonic acid (C4)	PFNS	Perfluorononane sulfonic acid (C9)	Perfluoroocta	PFOSA
PFBA	Perfluorobutanoic acid (C4)	PFNA	Perfluorononanoic acid (C9)	Fluorotelome	4:2 FTS
PFPeS	Perfluoropentane sulfonic acid (C5)	PFDS	Perfluorodecane sulfonic acid (C10)	Fluorotelome	6:2 FTS
PFPeA	Perfluoropentanoic acid (C5)	PFDA	Perfluorodecanoic acid (C10)	Fluorotelome	8:2 FTS
PFHxS	Perfluorohexanesulfonoic acid (C6)	PFUnA	Perfluoroundecanoic acid (C11)	11-Chloroeic	1Cl-PF3OUdS
PFHxA	Perfluorohexanoic acid (C6)	PFDoA	Perfluorododecanoic acid (C12)	9-Chlorohexa	9Cl-PF3ONS
PFHpS	Perfluoroheptane sulfonic acid (C7)	PFTTrDA	Perfluorotridecanoic acid (C13)	4,8-Dioxa-3H	ADONA
PFHpA	Perfluoroheptanoic acid (C7)	PFTeDA	Perfluorotetradecanoic acid (C14)	2,3,3,3-Tetra	HFPO-DA
PFOS	Perfluorooctanesulfonic acid (C8)	MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)		
PFOA	Perfluorooctanoic acid (C8)	EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)		



Legend:

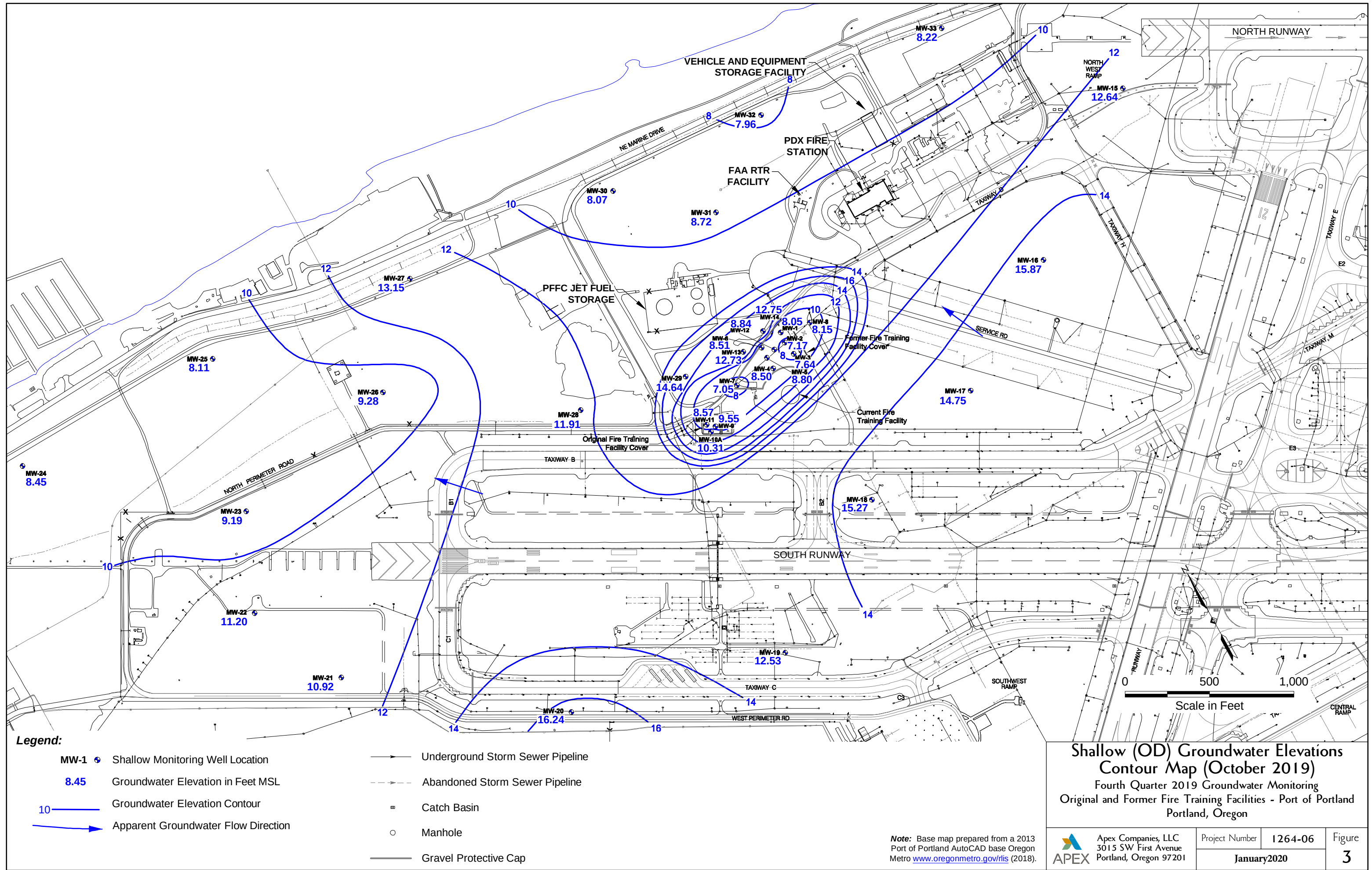
- | | | | |
|--|--|---------------------------------------|---|
| B-A-GW ● Shallow Groundwater and Vadose Zone Soil Location | MH-1 ▲ Stormwater Sample Location (Manhole) | —> Underground Storm Sewer Pipeline | ● Quarterly Sampling Wells
(Additional Investigation Work Plan Addendum; Apex, 2018) |
| B-M-1 ● Deep Groundwater Location (40'; Overbank Deposits) | SW-1 ◆ Surface Water Sample Location | - - -> Abandoned Storm Sewer Pipeline | |
| B-M-2 ● Co-located Deep Groundwater Location (61.5'; Columbia River Sand Aquifer) | MW-1 ● Shallow Monitoring Well Location | ■ Catch Basin | |
| | DW-1 ● Deep Monitoring Well Location | ○ Manhole | |
| | | — Gravel Protective Cap | |

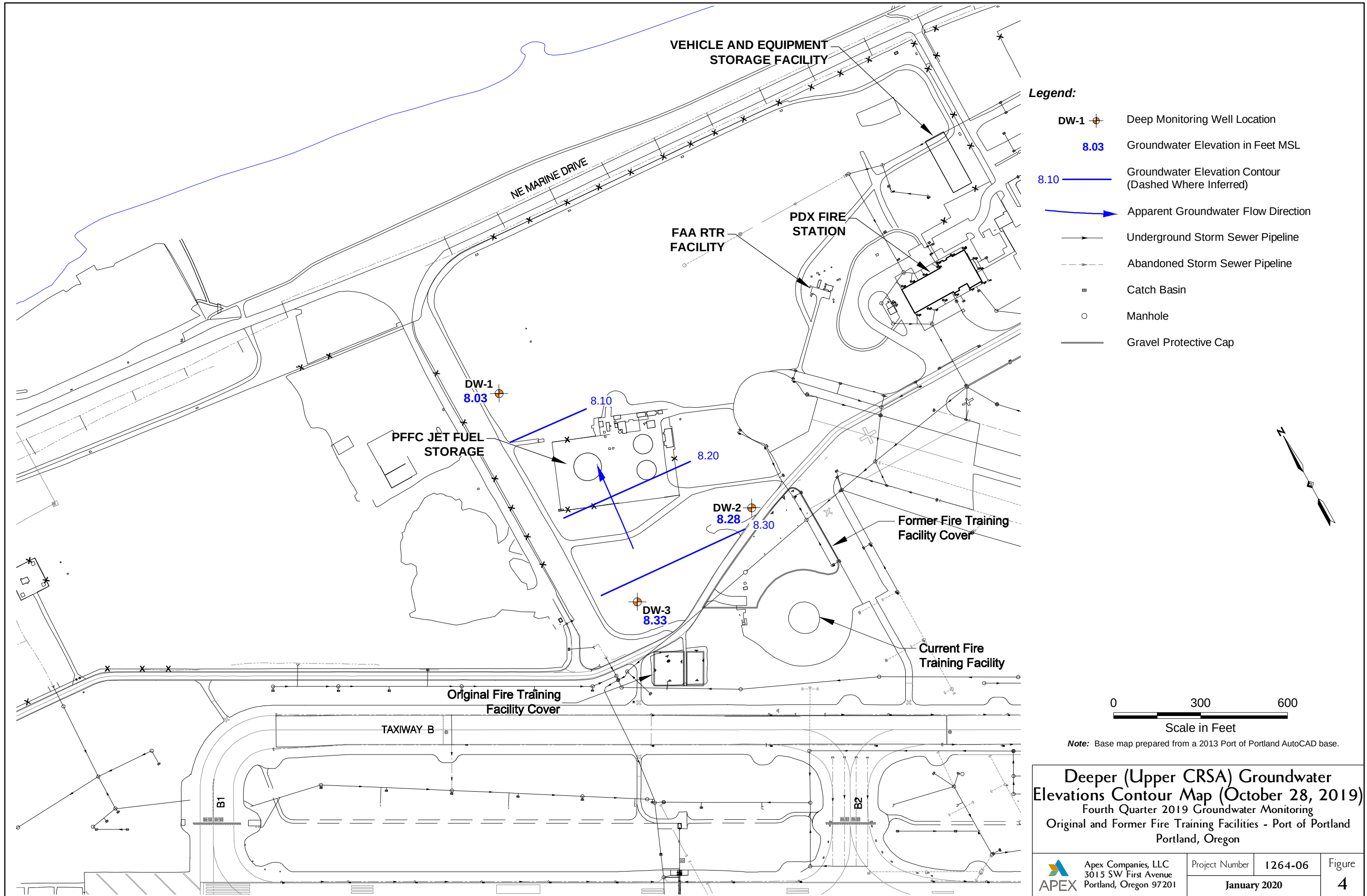
Note: Base map prepared from a 2013 Port of Portland AutoCAD base Oregon Metro www.oregonmetro.gov/rlls (2018).

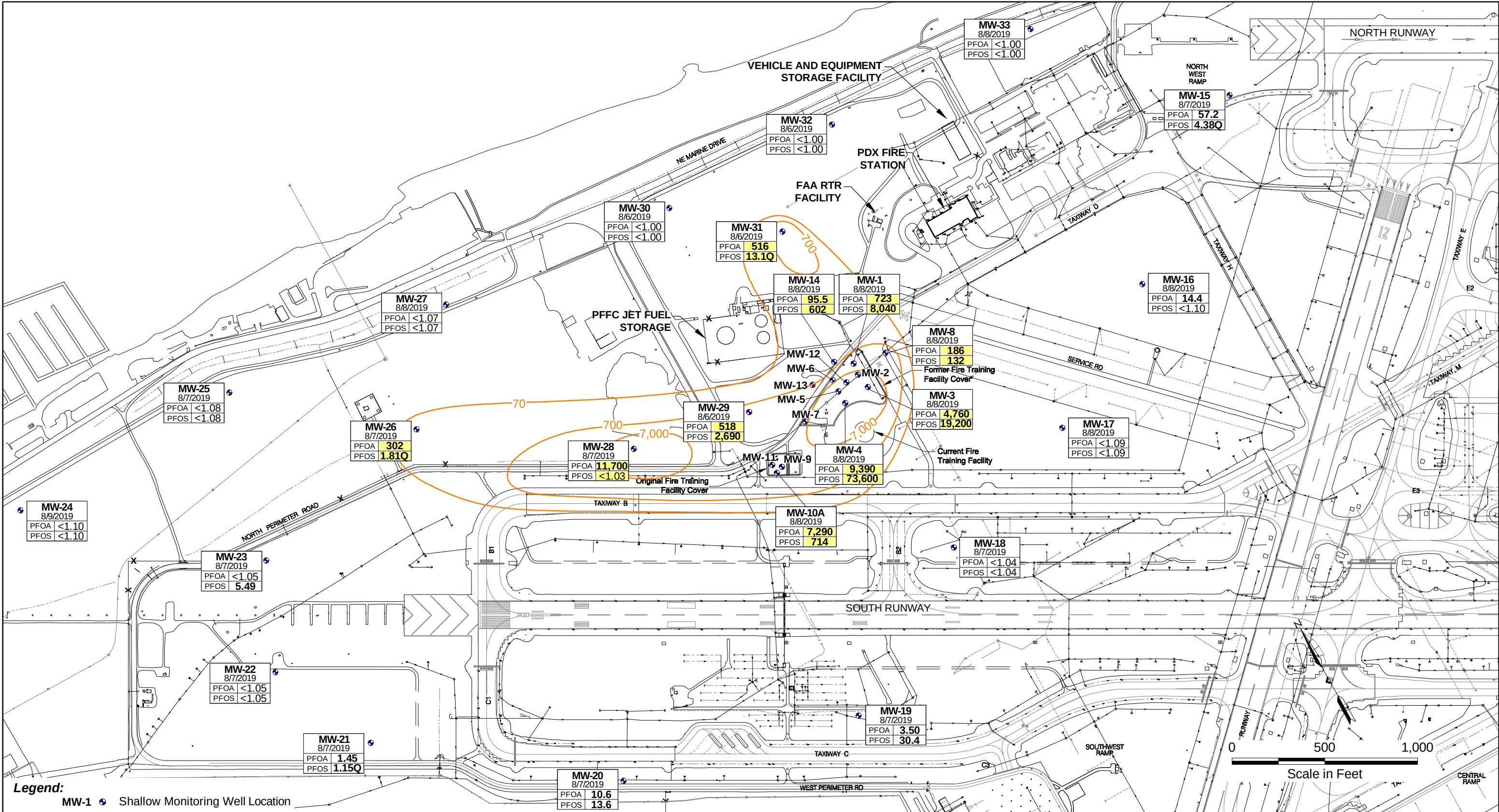
Site Vicinity Plan

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

 Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1264-06	Figure 2
	January 2020		







Legend:

MW-1 Shallow Monitoring Well Location

MW-1

8/8/2019

PFOA 723

PFOS 8,040

Location Identification

Date Sampled

Concentration in Nanograms per Liter (ng/L, ppt)

Analyte Sampled

Q = Identification of analyte could not be confirmed - Ion ratio exceeded control limit.

Highlight Exceeds EPA Health Advisory

US EPA Health Advisory for Drinking Water (ng/L)		
PFOA	Perfluorooctanoic Acid	70
PFOS	Perfluorooctanesulfonic Acid	(See Note)
Note: Combined concentration of PFOA and PFOS in drinking water.		

- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap

Isoconcentration Contour (Contours Represent the combined concentration of PFOA and PFOS)

Note: Base map prepared from a 2013 Port of Portland AutoCAD base Oregon Metro www.oregonmetro.gov/rliis (2018).

Shallow (OD) Isocontour Map
(November 2019)

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

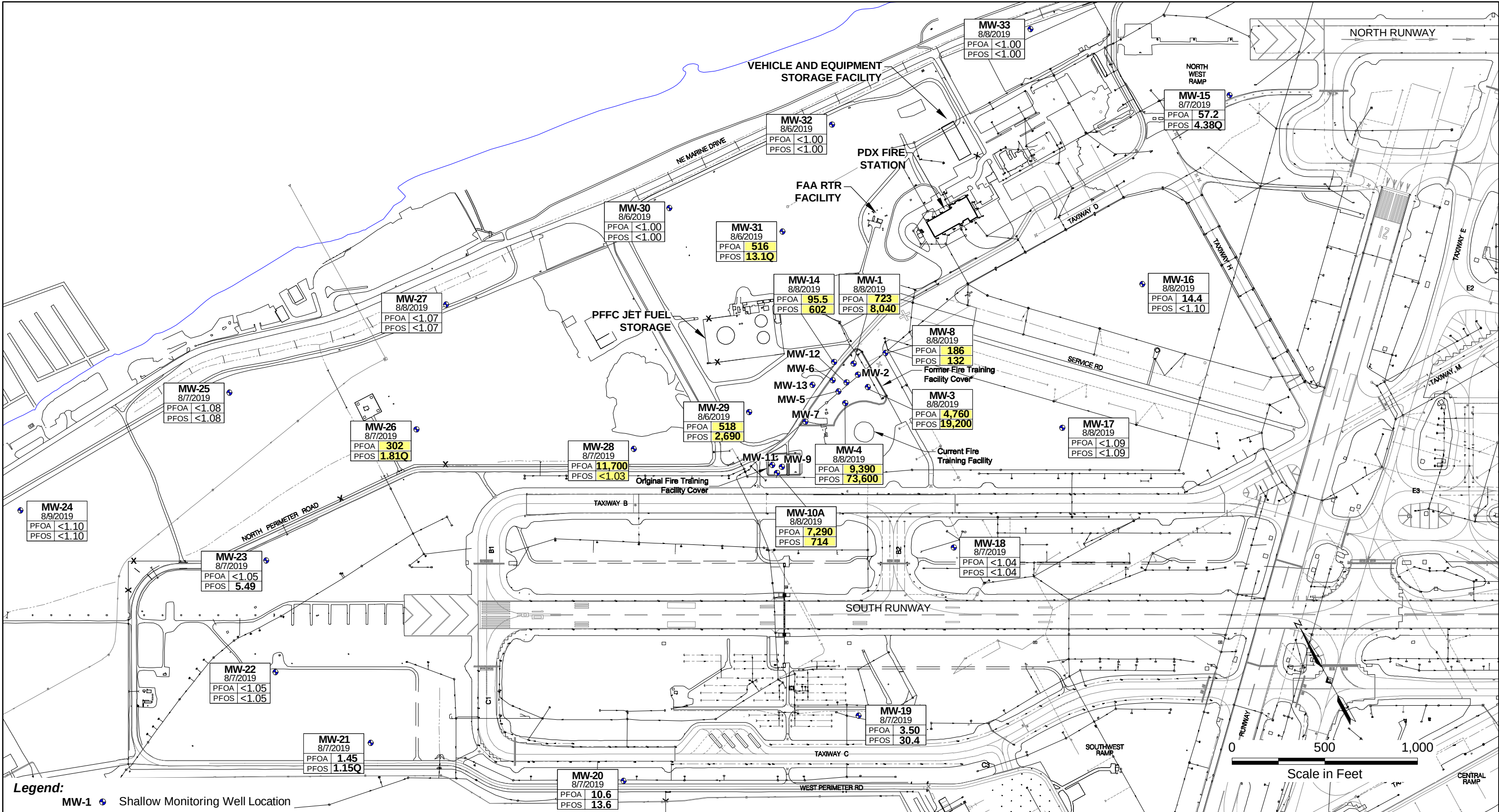
Project Number

1264-06

January 2020

Figure

5



Legend:

MW-1 • Shallow Monitoring Well Location

MW-1
8/8/2019
PFOA 723
PFOS 8,040

Location Identification

Date Sampled

Concentration in Nanograms per Liter (ng/L, ppt)

Analyte Sampled

Q = Identification of analyte could not be confirmed - Ion ratio exceeded control limit.

Highlight Exceeds EPA Health Advisory

US EPA Health Advisory for Drinking Water (ng/L)		
PFOA	Perfluorooctanoic Acid	70
PFOS	Perfluorooctanesulfonic Acid	(See Note)
Note: Combined concentration of PFOA and PFOS in drinking water.		

- Underground Storm Sewer Pipeline
- - - Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap

Groundwater Analytical Results for PFOA/PFOS

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Note: Base map prepared from a 2013 Port of Portland AutoCAD base Oregon Metro www.oregonmetro.gov/rlls (2018).

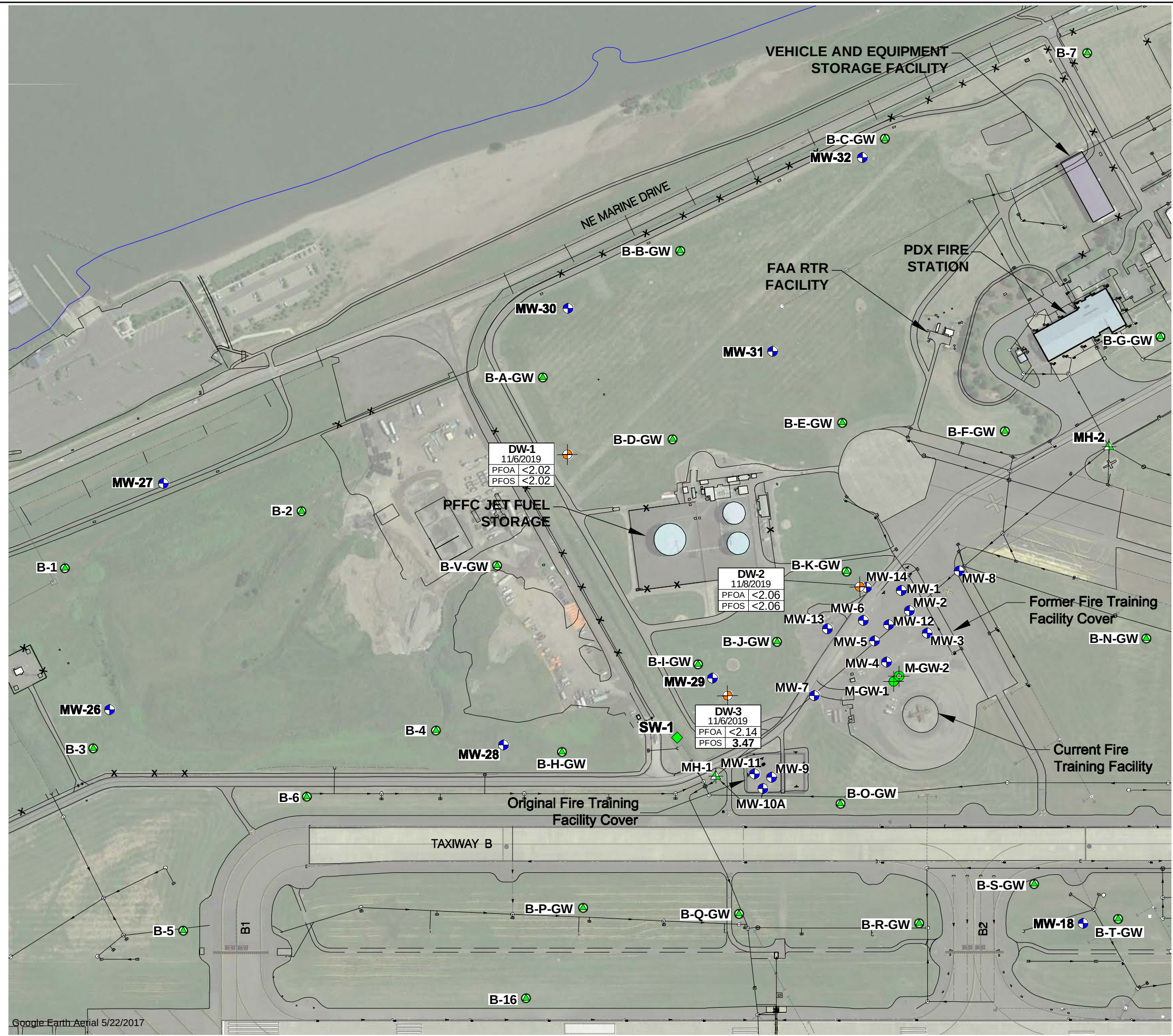


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January 2020

1264-06

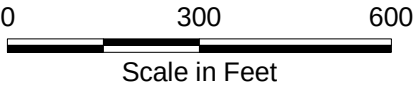
Figure
6



Legend:

- B-A-GW Shallow Groundwater and Vadose Zone Soil Location
- B-M-1 Deep Groundwater Location (40'; Overbank Deposits)
- B-M-2 Co-located Deep Groundwater Location (61.5'; Columbia River Sand Aquifer)
- MH-1 Stormwater Sample Location (Manhole)
- SW-1 Surface Water Sample Location
- MW-1 Shallow Monitoring Well Location
- DW-1 Deep Monitoring Well Location
- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap
- Location Identification
- Date Sampled
- Concentration in ng/L (ppt)
- Analyte Sampled

US EPA Health Advisory for Drinking Water (ng/L)		
PFOA	Perfluorooctanoic Acid	70
PFOS	Perfluorooctanesulfonic Acid	(See Note)
Note: Combined concentration of PFOA and PFOS in drinking water.		



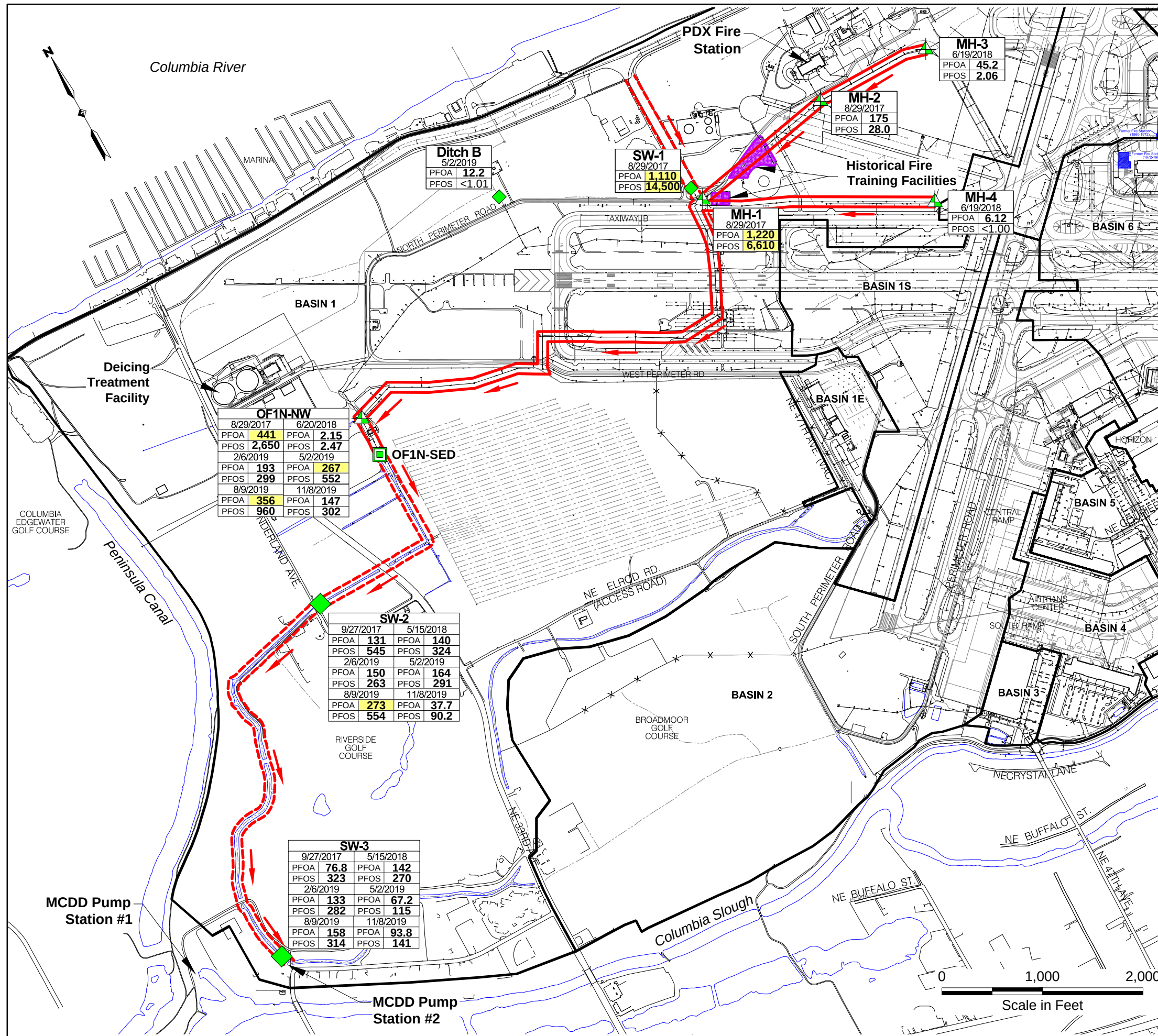
Note: Base map prepared from a 2013 Port of Portland AutoCAD base.

Groundwater Analytical Results for PFOA/PFOS - Upper CRSA Wells
Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1264-06
January 2020

Figure 7



Legend:

- MH-1 ▲ Stormwater Sample Location (Manhole)
- SW-1 ◆ Surface Water Sample Location
- OF1N-SED (Composite) ■ 5-Point Composite Sediment Sample Location
- Underground Storm Sewer Pipeline
- - - Abandoned Storm Sewer Pipeline
- ▤ Catch Basin
- Manhole
- ⊗ Manhole Catch Basin
- ⊙ Cleanout
- Area of Conveyance Line (Underground)
- - - Area of Drainage Ditch (Above Ground)
- ← Flow Direction
- Basin 1** Basin Boundary and Identification
- - - Port of Portland Property Line
- Groundwater Location Identification
- SW-1**
8/29/2017
PFOA 1,110
PFOS 14,500
Sample Date
Concentration in ng/L (ppt)
Analyte Sampled
- Highlight Exceeds Maine Screening Level for Construction Water

	Risk-Based Screening Levels		
	Recreational User	Construction Worker	Aquatic Organisms - Chronic
PFOA (Perfluorooctanoic Acid)	50 ng/L	220 ng/L	880,000 ng/L
PFOS (Perfluorooctanesulfonic Acid)	1,200 ng/L	5,300 ng/L	140,000 ng/L

Note: Base map prepared from a 2013 Port of Portland AutoCAD base.

Stormwater Drainage and Surface Water Analytical Results - PFOA/PFOS

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number **1264-06**

January 2020

Figure **8**

Appendix A

Survey of PFAS Screening Values

Table A-1
North American Standards and Guidance Values for PFAS in Water Used for Drinking
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		US EPA ^{12, 13, 40}			Alaska ¹⁴	California ¹⁵	Connecticut ¹⁶	Indiana ³⁹	Maine ¹⁷	Massachusetts ³⁸	Michigan ^{18, 20, 21}				Minnesota ²²			Nevada ²³	New York ³⁷	North Carolina ³⁶	New Hampshire ³⁴	Pennsylvania ³⁵	New Jersey ^{24, 25, 26, 27}			Rhode Island ³⁸	Texas ²⁹		Vermont ³⁰	Canada ^{31, 32, 33}		British Columbia ³⁸									
		Office of Water	Interim Recommendation Screening Levels	Regional	DEC	SWRCB	DPH	DEM	CDC	DEP	DEQ			DHHS	Department of Health			DEP	DWQC	DHHS	DES	DEP	DWQI	DEP	DEP	DEM	CEQ		Department of Health	Health Canada		British Columbia Office of Legislative Counsel									
				Regional Screening Level (TR=1E-06, THQ=1.0)	Action Level	Notification Level	Action Level	Screening Levels	Max. Exposure Guideline	Guidance Values	Water Quality Value	Generic Cleanup Criteria and Screening Levels		Screening Levels	Health Based Water Guidance			Basic Comparison Limit	Maximum Contaminant Level	Health Goal	Max. Contaminant Level	Health Advisory	Max. Contaminant Level		Interim Specific Ground Water Quality Criteria	Groundwater Quality Standard	Tier I Protective Concentration Level		Health Advisory	Screening Value	Max. Acceptable Concentration	Generic Numerical Water Standards									
												Drinking Surface Water	Residential Drinking Water		Nonresidential Drinking Water	Short-term	Subchronic	Chronic					Residential	Max. Contaminant Level			Health Goal	Max. Contaminant Level					Health Advisory	Max. Contaminant Level	Interim Specific Ground Water Quality Criteria	Groundwater Quality Standard	Tier I Protective Concentration Level	Health Advisory	Screening Value	Max. Acceptable Concentration	Generic Numerical Water Standards
												SW	DW/GW		DW/GW																										
DW	GW	TW	DW/GW/SW	DW	DW	GW - Tap	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW							
Concentrations in ng/L																																									
PFOA	Perfluorooctanoic acid (C8)	70 *	40 *	400	70 *	5.1	70 *	--	70 *	70 * c	420 a	70 * a	70 * a	9	35	35	35	667	10 c	--	12 c	70	14 c	--	10 a	70 * a	290	880	20 * a	200	200 a	200 a									
PFOS	Perfluorooctanesulfonic acid (C8)	70 *	40 *	400	70 *	6.5	70 *	--	70 *	70 * c	11 a	70 * a	70 * a	8	15	15	15	667	10 c	--	15 c	70	13 c	--	10 a	70 * a	560	1,700	20 * a	600	600 a	300 a									
PFBS	Perfluorobutanesulfonic acid (C4)	--	--	400,000	--	--	--	400,000	--	2,000 * c	--	--	--	1,000	3,000	3,000 **	2,000	667,000	--	--	--	--	--	--	--	--	34,000	100,000	--	15,000	--	--	80,000 a								
PFBA	Perfluorobutanoic acid (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	7,000 a	7,000 ** a	7,000 ** a	--	--	--	--	--	--	--	--	--	71,000	210,000	--	30,000	--	--									
PFNA	Perfluorononanoic acid (C9)	--	--	--	--	--	70 *	--	--	70 * c	--	--	--	9	--	--	--	--	--	--	11 c	--	--	13 a	--	--	290	880	20 * a	20	--	--									
PFPeA	Perfluoropentanoic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	93	280	--	200	--	--									
PFPeS	Perfluoropentane sulfonic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
PFHxA	Perfluorohexanoic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	93	280	--	200	--	--									
PFHxS	Perfluorohexanesulfonic acid (C6)	--	--	--	--	--	70 *	--	--	70 * c	--	--	--	84	47	47	47	--	--	--	18 c	--	--	--	--	--	93	280	20 * a	600	--	--									
PFHpA	Perfluoroheptanoic acid (C7)	--	--	--	--	--	70 *	--	--	70 * c	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	560	1,700	20 * a	200	--	--									
PFHpS	Perfluoroheptanesulfonic acid (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
PFOSA	Perfluorooctane sulfonamide (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	880	--	--	--	--									
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	880	--	--	--	--									
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	880	--	--	--	--									
PFDA	Perfluorodecanoic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370	1,100	--	--	--	--									
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	880	--	--	--	--									
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	880	--	--	--	--									
PFTIDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	880	--	--	--	--									
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
6:2 FTS	Fluorotelomer sulfonate (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200	--	--									
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200	--	--									
11Cl-PF3OUdS	11-Chloroicosfluoro-3-oxaundecane-1-sulfonic acid (F-538)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-538)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
ADONA	4,8-Dioxo-3H-perfluorononanoate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--									
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	140	--	--	--	--	--	--	--	--	--	--	--	--									

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)

2. -- = No criteria or screening level value established.

3. * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.

4. ** = Set at short-term value.

5. a = Promulgated rule

6. b = Guidance document in draft.

7. c = Recommended value, current law pending.

8. DW = Drinking water

9. SW = Surface water

10. GW = Groundwater

11. TW = Tap water

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41. Shading indicates values were used to screen groundwater results. See Table 5 and 6.

Table A-2
International Standards and Guidance Values for PFAS in Water Used for Drinking
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		Australia ⁶	Denmark ⁷	Germany ⁸				Italy ⁹	The Netherlands ¹⁰	Sweden ¹¹	United Kingdom ¹²
		Department of Health	Ministry of the Environment	Ministry of Health				National Institute of Health	RIVM	National Food Agency	Public Health England
	Health-Based Guidance Value	Health-Based Guidance	Health-Based Precautionary Value	Health-Based	Precautionary Action Value	Precautionary Action Value	Threshold Values	Maximum Permissible Concentration	Maximum Tolerable Level	Public Health Guidance	
					Infants	Adults		Surface water used for drinking			
		DW	DW	DW	DW	DW	DW	DW	SW	DW	DW
Concentrations in ng/L											
PFOA	Perfluorooctanoic acid (C8)	560	100 *	100 *	300 *	500 *	5,000 *	500	--	90 *	10,000
PFOS	Perfluorooctanesulfonic acid (C8)	70*	100 *	100 *	300 *	500 *	5,000 *	30	530	90 *	300
PFBS	Perfluorobutanesulfonic acid (C4)	--	100 *	--	--	--	--	500	--	90 *	--
PFBA	Perfluorobutanoic acid (C4)	--	100 *	--	--	--	--	500	--	--	--
PFNA	Perfluorononanoic acid (C9)	--	100 *	--	--	--	--	500	--	--	--
PFPeA	Perfluoropentanoic acid (C5)	--	100 *	--	--	--	--	500	--	90 *	--
PFPeS	Perfluoropentane sulfonic acid (C5)	--	--	--	--	--	--	500	--	--	--
PFHxA	Perfluorohexanoic acid (C6)	--	100 *	--	--	--	--	500	--	90 *	--
PFHxS	Perfluorohexanesulfonic acid (C6)	70*	100 *	--	--	--	--	500	--	90 *	--
PFHpA	Perfluoroheptanoic acid (C7)	--	100 *	--	--	--	--	500	--	90 *	--
PFHpS	Perfluoroheptanesulfonic acid (C7)	--	--	--	--	--	--	500	--	--	--
PFOSA	Perfluorooctane sulfonamide (C8)	--	100 *	--	--	--	--	500	--	--	--
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	--	500	--	--	--
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	--	500	--	--	--
PFDA	Perfluorodecanoic acid (C10)	--	100 *	--	--	--	--	500	--	--	--
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	--	500	--	--	--
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	--	500	--	--	--
PFTrDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	--	500	--	--	--
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	500	--	--	--
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	500	--	--	--
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	500	--	--	--
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	500	--	--	--
6:2 FTS	Fluorotelomer sulfonate (C6)	--	100 *	--	--	--	--	500	--	--	--
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--	--	500	--	--	--
11Cl-PF3OUdS	11-Chloroicosafuoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--	--	500	--	--	--
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--	--	500	--	--	--
ADONA	4,8-Dioxo-3H-perfluorononanoate	--	--	--	--	--	--	500	--	--	--
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--	--	500	--	--	--

Notes:

- Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
- = No criteria or screening level value established.
- * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.
- DW = Drinking water
- SW = Surface water
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- National Institute for Public Health and the Environment (RIVM). *Environmental risk limits for PFOS*. Report 601714013/2010. Accessed December 31, 2019.
- Sweden National Food Administration (NFA) 2016. *Risk management of PFAA in drinking water and fish* (In Swedish).
- Public Health England. *PFOS and PFOA General Information*. 2009. Accessed December 31, 2019.

Table A-3
North American Non-Drinking Groundwater Standards and Guidance Values for PFAS for Protection of Health and Environment
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		Alaska ¹⁰	Colorado ¹¹	Delaware ^{12, 13}		Iowa ¹⁴		Maine ¹⁵		Michigan ¹⁶	Montana ²³	New Hampshire ¹⁷	New Jersey ¹⁸	North Carolina ¹⁹	Texas ²⁰		Vermont ²¹		Canada ²²
		DEC	DPHE	DNREC		DNR		DEP		DEQ	DEQ	DES	DEP	DWQ	CEQ		DEC		Minister of the Environment
		Cleanup Level	Groundwater Quality Standard	Reporting Level	Screening Level	Statewide Standard		Remedial Action Guidelines		Generic Cleanup Criteria and Screening Levels	Numeric Water Quality Standard - Human Health	Ambient Groundwater Quality Standard	Interim Groundwater Quality Standard	Interim Maximum Allowable Standard	Protective Concentration Level		Health Advisory	Preventative Action Level	Groundwater Quality Guidelines
								Residential	Construction Worker						GW/SW Interface Criteria	Residential Class 3 Contaminated GW			
		GW	GW	GW	GW	Protected GW ⁶	Non-Protected GW ⁷	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
		Concentrations in ng/L																	
PFOA	Perfluorooctanoic acid (C8)	400 a	70 a, c	70 *	70 *	70 * a	50,000 a	400	750,000	12,000 a	70 a	12 a	10 a	2,000 a	29,000	88,000	20 *	10 *	--
PFOS	Perfluorooctanesulfonic acid (C8)	400 a	70 a, c	70 *	70 *	70 * a	1,000 a	400	750,000	12 a	70 a	15 a	10 a	--	56,000	170,000	20 *	10 *	68,000
PFBS	Perfluorobutanesulfonic acid (C4)	--	--	--	40,000	140,000 a	700,000 a	400,000	100,000,000	--	--	--	--	--	3,400,000	10,000,000	--	--	--
PFBA	Perfluorobutanoic acid (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	7,100,000	21,000,000	--	--	--
PFNA	Perfluorononanoic acid (C9)	--	--	--	--	--	--	--	--	--	--	11 a	13 a	--	29,000	88,000	20 *	10 *	--
PFPeA	Perfluoropentanoic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	9,300	28,000	--	--	--
PFPeS	Perfluoropentane sulfonic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	Perfluorohexanoic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	9,300	28,000	--	--	--
PFHxS	Perfluorohexanesulfonic acid (C6)	--	--	--	--	--	--	--	--	--	--	18 a	--	--	9,300	28,000	20 *	10 *	--
PFHpA	Perfluoroheptanoic acid (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	56,000	170,000	20 *	10 *	--
PFHpS	Perfluoroheptanesulfonic acid (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	Perfluorooctane sulfonamide (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	29,000	88,000	--	--	--
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	29,000	88,000	--	--	--
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	29,000	88,000	--	--	--
PFDA	Perfluorodecanoic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	37,000	110,000	--	--	--
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	29,000	88,000	--	--	--
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	29,000	88,000	--	--	--
PFTriDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	29,000	88,000	--	--	--
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	Fluorotelomer sulfonate (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11CI-PF3OUdS	11-Chloroicosafuoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	4,8-Dioxa-3H-perfluorononanoate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

- Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
- = No criteria or screening level value established.
- * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.
- a = Promulgated rule
- c = Site-Specific to El Paso County only.
- A saturated bed, formation, or group of formations which has a hydraulic conductivity of at least 0.44 meters per day (m/d) and a total dissolved solids concentration of less than 2,500 milligrams per liter (mg/L).
- A saturated bed, formation or group of formations which is not a protected groundwater source.
- GW= Groundwater
- DES = Department of Environmental Services
- Alaska Department of Environmental Conservation (DEC), July 2017. 18 AAC 75. *Oil and Other Hazardous Substances Pollution Control* as amended through October 27, 2018 (p 89). Accessed December 31, 2019.
- Colorado Department of Public Health and the Environment (CDPHE). Site-specific Groundwater Standard PFOA/PFOS in El Paso County. Adopted by the Water Quality Control Commission on April 9, 2018. The groundwater quality standard became effective on June 30, 2018. Accessed December 31, 2019.
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- Delaware Department of Natural Resources and Environmental Control Site Investigation and Restoration Section (DNREC-SIRS). *Screening Level Table*. January 2013, updated February 2018 (p 23). Accessed October 2, 2019.
- Iowa Department of Natural Resources (IDNR). Statewide Standards. Accessed December 31, 2019.
- Maine Department of Environmental Protection (DEP). *Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances*, October 19, 2018 (p 58). Accessed December 31, 2019.
- Michigan DEQ. *Table 1. Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels*. January 10, 2018; updated June 25, 2018. Accessed December 13, 2019.
- New Hampshire Code of Administrative Rules. *Chapter EN-Or 600 Contaminated Site Management*. Accessed December 31, 2019.
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- North Carolina Environmental Quality Division of Water Quality Planning (DWQ). Appendix #1: *Interim Maximum Allowable Concentrations (IMACs)* . Updated April 6, 2018. Accessed December 31, 2019.
- North Carolina Environmental Quality Division of Water Quality Planning (DWQ). Appendix #1: *Interim Maximum Allowable Concentrations (IMACs)* . Updated April 6, 2018. Accessed December 31, 2019.
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- Montana Department of Environmental Quality (DEQ). 2019. Circular DEQ-7, Montana Numeric Water Quality Standards. June. Accessed December 31, 2019.

Table A-4
International Non-Drinking Groundwater Standards and Guidance Values for PFAS for Protection of Health and Environment
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		Germany State Of Bavaria ⁶	Germany ^{7,8}		The Netherlands ⁹	Sweden ¹⁰
		Bavarian State Office for the Environment	State of Baden-Wurtemberg	GMH	RIVM	Swedish Geotechnical Institute
		Provisional Threshold	Provisional Threshold	FFS	Maximum Permissible Concentration	Preliminary Guide Value
					Freshwater	Lowest value from exposure routes
		GW	GW	GW	GW/SW	GW
Concentrations in ng/L						
PFOA	Perfluorooctanoic acid (C8)	100 ^^	300^^	100	--	--
PFOS	Perfluorooctanesulfonic acid (C8)	100^^	230 (300^^)	100	0.65	45
PFBS	Perfluorobutanesulfonic acid (C4)	6,000^^	3,000^^	6,000	--	--
PFBA	Perfluorobutanoic acid (C4)	10,000^^	7,000^^	10,000	--	--
PFNA	Perfluorononanoic acid (C9)	60^^	300^^	60	--	--
PFPeA	Perfluoropentanoic acid (C5)	3,000	3,000^^	--	--	--
PFPeS	Perfluoropentane sulfonic acid (C5)	--	1,000^^	--	--	--
PFHxA	Perfluorohexanoic acid (C6)	6,000^^	1,000^^	6,000	--	--
PFHxS	Perfluorohexanesulfonic acid (C6)	100^^	300^^	1000	--	--
PFHpA	Perfluoroheptanoic acid (C7)	300	300^^	--	--	--
PFHpS	Perfluoroheptanesulfonic acid (C7)	300	300^^	--	--	--
PFOSA	Perfluorooctane sulfonamide (C8)	100	--	--	--	--
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--
PFDA	Perfluorodecanoic acid (C10)	100	300^^	--	--	--
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--
PFTrDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--
6:2 FTS	Fluorotelomer sulfonate (C6)	100	300^^	--	--	--
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--
11CI-PF3OUdS	11-Chloroicosafuoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--
ADONA	4,8-Dioxo-3H-perfluorononanoate	--	--	--	--	--
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)

2. -- = No criteria or screening level value established.

3. ^^ = When these compounds are present at the same the following equation is to be used: $\Sigma (\text{Concentration/Limit}) \leq 1$.

4. GW = Ground water

5. SW = Surface water

6. Bavarian State Office of the Environment. *Leitlinien zur vorläufigen Bewertung von PFC-Verunreinigungen in Wasser und Boden*. April 2017 update. Accessed August 17, 2017.

7. Environmental Science for the European Refining Industry. *Environmental fate and effects of poly- and perfluoroalkyl substances*. August 2016. Accessed October 3, 2019.

8. German Ministry of Health (GMH), von der Trenck et al. 2018. *Significance thresholds for the assessment of contaminated groundwater: perfluorinated and polyfluorinated chemicals*. Environ Sci Eur (2018) 30:19. Accessed January 2, 2020.

9. National Institute for Public Health and the Environment (RIVM). *Environmental risk limits for PFOS*. Report 601714013/2010. Accessed December 31, 2019.

10. Swedish Geotechnical Institute. *Preliminary guideline values for highly fluorinated substances (PFAS) in soil and groundwater*. 2015. Accessed October 3, 2017.

11. Shading indicates values were used to screen groundwater results. See Table 5 and 6.

Table A-5
North American Non-Drinking Surface Water Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		Florida ⁶		Maine ⁷						Maine ⁸	Michigan ⁹				Minnesota ¹⁰		Canada ¹¹	British Columbia ¹²
		DEP		CDC						CDC	DEQ				MPCA		Minister of the Environment	British Columbia Office of Legislative Counsel
		Screening Level		Former Screening Levels						Screening Level	Water Quality Values				Site-Specific Numeric Water Quality Criteria		Environmental Quality Guidelines	Generic Numerical Water Standards
		SW		Child Wading	Child Swimming	Adult Wading	Adult Swimming	Recreational	Construction Worker	SW/RW	Non-Drinking Surface Water	Final Chronic Value	Aquatic Max Values	Final Acute Value	Lake	River	Benchmark for the Quality of the Ambient Environment	Aquatic Life
				SW	SW	SW	SW	SW	SW		SW	SW	SW	SW	SW	SW	SW	SW
		Concentrations in ng/L																
PFOA	Perfluorooctanoic acid (C8)	150	60	50	440	270	50	220	170	12,000 a	880,000 a	7,700,000 a	15,000,000 a	1,620	6.1	--	--	
PFOS	Perfluorooctanesulfonic acid (C8)	4	1,400	1,200	10,400	6,500	1,200	5,300	300	12 a	140,000 a	780,000 a	1,600,000 a	2,700	7	6,800 a	60,000 a	
PFBS	Perfluorobutanesulfonic acid (C4)	--	--	--	--	--	--	--	7,914,000	--	--	--	--	--	--	--	--	
PFBA	Perfluorobutanoic acid (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFNA	Perfluorononaic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFPeA	Perfluoropentanoic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFPeS	Perfluoropentane sulfonic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHxA	Perfluorohexanoic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHxS	Perfluorohexanesulfonic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHpA	Perfluoroheptanoic acid (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHpS	Perfluoroheptanesulfonic acid (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFOSA	Perfluorooctane sulfonamide (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDA	Perfluorodecanoic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFTTrDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
6:2 FTS	Fluorotelomer sulfonate (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11CI-Pf3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
ADONA	4,8-Dioxa-3H-perfluorononanoate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)

2. -- = No criteria or screening level value established.

3. a = Promulgated rule

4. b = Guidance document in draft.

5. SW = Surface water

6. Florida Department of Environmental Protection (DEP). *Development of Surface Water Screening Levels for PFOA and PFOS Based on the Protection of Human Health*. Accessed December 12, 2019.

7. Maine Department of Environmental Health, Center for Disease Control and Prevention (CDC), Department of Health and Human Services. *Human Health Risk-Based Screening Levels for Perfluoroalkyl Compounds* . June 6, 2014. Accessed August 8, 2017.

These screening values are no longer in use by the Maine CDC.

8. Maine Center for Disease Control and Prevention (CDC). 2016. Interdepartmental Memo from MeCDC to DEP regarding Human Health Risk-Based Screening Levels for Perfluoroalkyl Compounds. August 17. Contact Maine CDC for Copy of this Reference.

9. Michigan Department of Environmental Quality (DEQ). *Rule 57 Water Quality Values*. Surface Water Assessment Section, August 1, 2019. Accessed December 13 2019.

10. Minnesota Pollution Control Agency. Human Health-Based Site Specific Water Quality Standards Technical Support Document. June 2017. Accessed January 2, 2020.

11. Environment and Climate Change Canada. *Canadian Environmental Protection Act, 1999 Federal Environmental Quality Guidelines Perfluorooctane Sulfonate (PFOS)*. June 2018 . Accessed January 2, 2020.

12. British Columbia Office of Legislative Counsel, Ministry of Attorney General, Victoria, British Columbia. Environmental Management Act. Contaminated Sites Regulation. B.C. Rg. 375/96. Amended January 24, 2019. Accessed December 31, 2019.

13. Stormwater and surface water analytical results from the investigation were screened against the Maine Department of Environmental Health, CDC, Human Health Risk-Based Screening Levels for Perfluoroalkyl Compounds for recreational use.

14. Stormwater and surface water analytical results from the investigation were screened against the Michigan DEQ water quality values for aquatic species.

15. Shading indicates values were used to screen stormwater and surface water results from the investigation. See Table 7.

Table A-6
International Non-Drinking Surface Water Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		Australia ⁶	Australia ⁷				EU ⁸		Germany State of Bavaria ⁹	The Netherlands ¹⁰	
		Department of Health	HEPA				Annual Average Environmental Quality Standard	Maximum Acceptable Concentration	Bavarian State Office for the Environment	RIVM	
		Health-Based Guidance Values	Ecological Criteria						Predicted No Effect Concentration	Maximum Permissible Concentration	
			Freshwater 99% species protection	Freshwater 95% species protection	Freshwater 90% species protection	Freshwater 80% species protection				Freshwater	Marine Water
		RW	SW	SW	SW	SW	SW (Inland)	SW (Inland)	SW	GW/SW	SW
		Concentrations in ng/L									
PFOA	Perfluorooctanoic acid (C8)	10,000	19,000	220,000	632,000	1,824,000	--	--	570,000	--	--
PFOS	Perfluorooctanesulfonic acid (C8)	2,000	0.23	130	2,000	31,000	0.65	36,000	50	0.65	0.53
PFBS	Perfluorobutanesulfonic acid (C4)	--	--	--	--	--	--	--	3,700,000	--	--
PFBA	Perfluorobutanoic acid (C4)	--	--	--	--	--	--	--	1,260,000	--	--
PFNA	Perfluorononanoic acid (C9)	--	--	--	--	--	--	--	--	--	--
PFPeA	Perfluoropentanoic acid (C5)	--	--	--	--	--	--	--	320,000	--	--
PFPeS	Perfluoropentane sulfonic acid (C5)	--	--	--	--	--	--	--	--	--	--
PFHxA	Perfluorohexanoic acid (C6)	--	--	--	--	--	--	--	1,000,000	--	--
PFHxS	Perfluorohexanesulfonic acid (C6)	2,000	--	--	--	--	--	--	250,000	--	--
PFHpA	Perfluoroheptanoic acid (C7)	--	--	--	--	--	--	--	--	--	--
PFHpS	Perfluoroheptanesulfonic acid (C7)	--	--	--	--	--	--	--	--	--	--
PFOSA	Perfluorooctane sulfonamide (C8)	--	--	--	--	--	--	--	--	--	--
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	--	--	--	--	--
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	--	--	--	--	--
PFDA	Perfluorodecanoic acid (C10)	--	--	--	--	--	--	--	--	--	--
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	--	--	--	--	--
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	--	--	--	--	--
PFTrDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	--	--	--	--	--
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	--	--	--	--
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	--	--	--	--
6:2 FTS	Fluorotelomer sulfonate (C6)	--	--	--	--	--	--	--	870,000	--	--
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OU	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ON	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--
ADONA	4,8-Dioxa-3H-perfluorononanoate	--	--	--	--	--	--	--	--	--	--
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--	--	--	--	--	--

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)

2. -- = No criteria or screening level value established.

3. SW = Surface water

4. GW = Groundwater

5. RW = Recreational water

6. Australian Government Depart of Health. *Health Based Guidance Values for PFAS*. December 13, 2019.

7. Australia and New Zealand Heads of Environmental Protection Agencies (HEPA). *PFAS National Environmental Management Plan*. January 2018. Accessed January 2, 2020.

8. European Union (EU), August 2013. Water Framework Directive 2013/39/EU, Environmental Quality Standards.

9. Bavarian State Office of the Environment. *Leitlinien zur vorläufigen Bewertung von PFC-Verunreinigungen in Wasser und Boden*. April 2017 update. Accessed August 17, 2017.

10. National Institute for Public Health and the Environment (RIVM). *Environmental risk limits for PFOS*. Report 601714013/2010. Accessed December 31, 2019.

Table A-7
Summary of Standards and Guidance Values for PFAS Used in Site-Related Risk Screening
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		Groundwater Risk-Based Screening Levels					Surface Water and Stormwater Risk-Based Screening Levels			
		US EPA ^{10, 11}		Canada ^{16, 17, 18}	Germany ^{19, 20}	North Carolina ¹⁵	Texas ¹²	Maine ¹³		Michigan ¹⁴
		Office of Water	Regional	Health Canada	State of Baden-Wurttemberg	DHHS	CEQ	CDC		DEQ
		Health Advisory	Regional Screening Level	Screening Value	Provisional Threshold	Health Goal	Tier I Protective Concentration Level	Screening Level	Construction Worker	Water Quality Values
(TR=1E-06, THQ=1.0)	Residential Ingestion		Recreational				Construction Worker	Final Chronic Value		
		DW	TW	DW	GW	DW	GW	SW	SW	SW
Concentrations in ng/L										
PFOA	Perfluorooctanoic acid (C8)	70 *	400	200	300 ^{AA}	--	290	50	220	880,000 a
PFOS	Perfluorooctanesulfonic acid (C8)	70 *	400	600	230 (300 ^{AA})	--	560	1,200	5,300	140,000 a
PFBS	Perfluorobutanesulfonic acid (C4)	--	400,000	15,000	3,000 ^{AA}	--	34,000	--	--	--
PFBA	Perfluorobutanoic acid (C4)	--	--	30,000	7,000 ^{AA}	--	71,000	--	--	--
PFNA	Perfluorononanoic acid (C9)	--	--	20	300 ^{AA}	--	290	--	--	--
PFPeA	Perfluoropentanoic acid (C5)	--	--	200	3,000 ^{AA}	--	93	--	--	--
PFPeS	Perfluoropentane sulfonic acid (C5)	--	--	--	1,000 ^{AA}	--	--	--	--	--
PFHxA	Perfluorohexanoic acid (C6)	--	--	200	1,000 ^{AA}	--	93	--	--	--
PFHxS	Perfluorohexanesulfonic acid (C6)	--	--	600	300 ^{AA}	--	93	--	--	--
PFHpA	Perfluoroheptanoic acid (C7)	--	--	200	300 ^{AA}	--	560	--	--	--
PFHpS	Perfluoroheptanesulfonic acid (C7)	--	--	--	300 ^{AA}	--	--	--	--	--
PFOSA	Perfluorooctane sulfonamide (C8)	--	--	--	--	--	290	--	--	--
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	290	--	--	--
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	290	--	--	--
PFDA	Perfluorodecanoic acid (C10)	--	--	--	300 ^{AA}	--	370	--	--	--
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	290	--	--	--
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	290	--	--	--
PFTriDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	290	--	--	--
H4PFOS	6:2 Fluorotelomer sulfonic acid (C6)	--	--	--	--	--	--	--	--	--
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	--	--	--
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	--	--	--
6:2 FTS	Fluorotelomer sulfonate (C6)	--	--	200	300 ^{AA}	--	--	--	--	--
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	200	--	--	--	--	--	--
11CI-PF3OUdS	11-Chloroicosfluoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--
ADONA	4,8-Dioxo-3H-perfluorononanoate	--	--	--	--	--	--	--	--	--
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	140	--	--	--	--

Notes:

- Water standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
- = No criteria or screening level value established.
- * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.
- a = Promulgated rule
- DW = Drinking water
- SW = Surface water
- GW = Groundwater
- TW = Tap water
9. Shading indicates values were used to screen results from the investigation. See Table 2, Table 3 and Table 7.
- United States Environmental Protection Agency (US EPA), May 2016. *Lifetime Health Advisories and Health Effects Support Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate*. Federal Register EPA-HQ-OW-2014-0138; FRL-9946-91-OW, Vol. 81, No. 101 (25 May 2016), pp 33250-33251. Accessed December 13, 2019.
- Interstate Technology Regulatory Council (ITRC), November 2019. PFAS -- Per- and Polyfluoroalkyl Substances. *Regulations, Guidance and Advisories*, Section 4 Tables, Table 4-1.
- Texas Commission on Environmental Quality (TCEQ). *Texas Risk Reduction Program (TRRP) Protective Concentration Levels*. March 2017. Accessed December 13, 2019.
- Maine Department of Environmental Health, Center for Disease Control and Prevention (CDC), Department of Health and Human Services. *Human Health Risk-Based Screening Levels for Perfluoroalkyl Compounds*. June 6, 2014. Accessed August 8, 2017. These screening values are no longer in use by the Maine CDC.
- Michigan Department of Environmental Quality (DEQ). *Rule 57 Water Quality Values*. Surface Water Assessment Section, October 21, 2016. Accessed December 13, 2019.
- North Carolina Department of Health and Human Services (NC DHHS). 2017. GenX Health Information. Accessed December 13, 2019.
- Health Canada. *Health Canada's Drinking Water Screening Values for Perfluoroalkylated Substances (PFAS)*. July 2018. Accessed December 13, 2019.
- Health Canada. 2018. *Guidelines for Canadian Drinking Water Quality, Guideline Technical Document. Perfluorooctanoic Acid (PFOA)*. December 2018. Accessed December 13, 2019.
- Health Canada. 2018. *Guidelines for Canadian Drinking Water Quality, Guideline Technical Document. Perfluorooctane Sulfonate (PFOS)*. December 2018. Accessed December 13, 2019.
- Environmental Science for the European Refining Industry. *Environmental fate and effects of poly- and perfluoroalkyl substances*. August 2016. Accessed October 3, 2019.
- German Ministry of Health (GMH), von der Trenck et al. 2018. *Significance thresholds for the assessment of contaminated groundwater: perfluorinated and polyfluorinated chemicals*. Environ Sci
- AA = When these compounds are present at the same the following equation is to be used: $\sum (\text{Concentration/Limit}) \leq 1$.

Table A-8
North American Soil Standards and
Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		US EPA ^{13, 14}			Alaska ¹⁵				Delaware ¹⁶		Indiana ²⁷			Iowa ¹⁷	Maine ¹⁸					Michigan ¹⁹	Minnesota ²⁰			Nevada ²¹			New Hampshire ²²	North Carolina ²³			
		Regional Screening Level			Cleanup Level				Reporting Level	Screening Level	IDEM Screening Levels			Statewide Standards	Remedial Action Guidelines					Generic Cleanup Criteria and Screening Levels	Pollution Control Agency			Basic Comparison Level			Direct Contact RBC	Preliminary Soil Remediation Goal			
		(TR=1E-06, THQ=1.0)			Arctic Zone	Under 40" Zone	Over 40" Zone	Migration to GW			Residential	Commercial/Industrial	Excavation		Shallow Soil Exposure (0-10ft)	Leaching to GW	Residential Soil	Park User	Commercial Worker		Construction Worker	GSI Protection Criteria	Residential Soil Reference Value	Industrial Soil Reference Value	Residential	Indoor		Outdoor	Residential Health	Industrial/Commercial Health	Protection of Groundwater
		Residential	Industrial	Protection of GW																											
		Concentrations in µg/kg																													
PFOA	Perfluorooctanoic acid (C8)	1,260	16,400	0.172	2,200	1,600	1,300	1.7	16,000	16,000	--	--	--	35,000	9.5	1,700	4,900	22,000	5,100	10,000	240	3,200	1,560	46,700	26,000	200	--	--	--	17	
PFOS	Perfluorooctanesulfonic acid (C8)	1,260	16,400	0.378	2,200	1,600	1,300	3	6,000	6,000	--	--	--	1,800	21	1,700	4,900	22,000	5,100	0.24	41	560	1,560	46,700	26,000	100	--	--	--	--	
PFBS	Perfluorobutanesulfonic acid (C4)	1,260,000	16,400,000	130	--	--	--	--	1,300,000	130,000	1,800	16,000	34,000	1,200,000	7,100	1,700,000	4,900,000	22,000,000	51,000,000	--	5,700	77,000	125,000 sat	125,000 sat	125,000 sat	--	250,000	3,300,000	910	--	
PFBA	Perfluorobutanoic acid (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	38,000	520,000	--	--	--	--	--	--	--	--	
PFNA	Perfluorononanoic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100	--	--	--	--	
PFPeA	Perfluoropentanoic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHxA	Perfluorohexanoic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHxS	Perfluorohexanesulfonic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHpA	Perfluoroheptanoic acid (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	130	1,700	--	--	--	100	--	--	--	--	
PFOSA	Perfluorooctane sulfonamide (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	9.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDA	Perfluorodecanoic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFTriDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,700	4,900	--	--	--	--	--	--	--	--	--	--	--	--	--	
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
6:2 FTS	Fluorotelomer sulfonate (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
ADONA	4,8-Dioxa-3H-perfluorononanoate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Please refer to notes at end of table.

Table A-8
North American Soil Standards and
Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

Texas ²⁴												
Protective Concentration Level												
Residential - 0.5 Acre	Residential - 0.5 Acre	Residential - 0.5 Acre	Residential - 30 Acres	Residential - 30 Acres	Residential - 30 Acres	Commercial - 0.5 Acre	Commercial - 0.5 Acre	Commercial - 0.5 Acre	Commercial - 30 Acres	Commercial - 30 Acres	Commercial - 30 Acres	Commercial - 30 Acres
Inhalation, ingestion, dermal, vegetable consumption	Groundwater Protection Ingestion	Groundwater Protection Class 3	Inhalation, ingestion, dermal, vegetable consumption	Groundwater Protection Ingestion	Groundwater Protection Class 3	Inhalation, ingestion, dermal, vegetable consumption	Groundwater Protection Ingestion	Groundwater Protection Class 3	Inhalation, ingestion, dermal, vegetable consumption	Groundwater Protection Ingestion	Groundwater Protection Class 3	Groundwater Protection Class 3
Concentrations in µg/kg												
PFOA <i>Perfluorooctanoic acid (C8)</i>	600	3	300	490	1.5	150	2,400	8.8	880	1,400	4.4	440
PFOS <i>Perfluorooctanesulfonic acid (C8)</i>	1,500	50	5,000	1,500	25	2,500	15,000	150	15,000	14,000	75	7,500
PFBS <i>Perfluorobutanesulfonic acid (C4)</i>	86,000	110	11,000	80,000	53	5,300	600,000	320	32,000	440,000	160	16,000
PFBA <i>Perfluorobutanoic acid (C4)</i>	180,000	200	20,000	160,000	98	9,800	1,100,000	580	58,000	820,000	290	29,000
PFNA <i>Perfluoronanoic acid (C9)</i>	760	3.1	310	730	1.5	150	6,100	9.2	920	4,900	4.6	460
PFPeA <i>Perfluoropentanoic acid (C5)</i>	250	0.32	32	250	0.16	16	2,600	0.95	95	2,600	0.48	48
PFHxA <i>Perfluorohexanoic acid (C6)</i>	250	0.48	48	250	0.24	24	2,600	1.4	140	2,600	0.72	72
PFHxS <i>Perfluorohexanesulfonic acid (C6)</i>	250	2	200	240	1	100	2,200	6.1	610	2,000	3	300
PFHpA <i>Perfluoroheptanoic acid (C7)</i>	1,500	4.6	460	1,500	2.3	230	16,000	14	1,400	16,000	6.8	680
PFOSA <i>Perfluorooctane sulfonamide (C8)</i>	58	920	92,000	31	460	46,000	87	2,800	280,000	45	1,400	140,000
PFUnA <i>Perfluoroundecanoic acid (C11)</i>	800	80	1,800	800	9.2	920	8,200	55	5,500	8,200	27	2,700
PFDoA <i>Perfluorododecanoic acid (C12)</i>	790	34	3,400	780	17	1,700	7,500	100	10,000	7,000	50	5,000
PFDA <i>Perfluorodecanoic acid (C10)</i>	990	22	2,200	980	11	1,100	9,400	67	6,700	8,800	33	3,300
PFDS <i>Perfluorodecanesulfonic acid (C10)</i>	800	40	4,000	800	20	2,000	8,200	120	12,000	8,200	60	6,000
PFTeDA <i>Perfluorotetradecanoic acid (C14)</i>	510	110	11,000	510	56	5,600	8,200	340	34,000	8,200	170	17,000
PFTrDA <i>Perfluorotridecanoic acid (C13)</i>	610	61	6,100	610	30	3,000	8,200	180	18,000	8,200	91	9,100
PFNS <i>Perfluorononane sulfonic acid (C9)</i>	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA <i>Methyl perfluorooctanesulfonamidoacetic acid (C8)</i>	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA <i>Ethyl perfluorooctanesulfonamidoacetic acid (C8)</i>	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS <i>Fluorotelomer sulfonate (C4)</i>	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS <i>Fluorotelomer sulfonate (C6)</i>	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS <i>Fluorotelomer sulfonate (C8)</i>	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS <i>11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B)</i>	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-Pf3ONS <i>9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)</i>	--	--	--	--	--	--	--	--	--	--	--	--
ADONA <i>4,8-Dioxa-3H-perfluorononanoate</i>	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA <i>2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)</i>	--	--	--	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table A-8
North American Soil Standards and
Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		British Columbia ²⁵																Canada ²⁶
		Numerical Soil Standards																Soil Screening Value
		Human Intake of Contaminated Soil								Groundwater Used for Drinking								Agricultural/Residential Parkland Use
		Wildlands Natural	Wildlands Reverted	Agricultural	Urban Park	Residential Low Density	Residential High Density	Commercial	Industrial	Wildlands Natural	Wildlands Reverted	Agricultural	Urban Park	Residential Low Density	Residential High Density	Commercial	Industrial	
Concentrations in µg/kg																		
PFOA	Perfluorooctanoic acid (C8)	--	--	--	--	--	--	--	--	350	350	350	350	350	350	350	350	700
PFOS	Perfluorooctanesulfonic acid (C8)	2,500	2,500	1,000	2,500	1,000	2,500	7,500	200,000	--	--	--	--	--	--	--	--	2,100
PFBS	Perfluorobutanesulfonic acid (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	61,000
PFBA	Perfluorobutanoic acid (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNA	Perfluorononanoic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFPeA	Perfluoropentanoic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800
PFHxA	Perfluorohexanoic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800
PFHxS	Perfluorohexanesulfonic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2,300
PFHpA	Perfluoroheptanoic acid (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800
PFOSA	Perfluorooctane sulfonamide (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	Perfluorodecanoic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	Fluorotelomer sulfonate (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	11-Chloroicosatluoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-Pf3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	4,8-Dioxa-3H-perfluorononanoate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

- Standards and guidance values in µg/kg (micrograms per kilogram), parts per billion (ppb)
- = No criteria or screening level value established.
- b = Guidance document in draft.
- c = Recommended value, current law pending.
- sat = Saturation limit
- More than 50% of mass contains particles greater than 75 µm mean diameter (D₅₀ > 75 µm).
- More than 50% of mass contains particles less than 75 µm mean diameter (D₅₀ < 75 µm).
- US EPA = United States Environmental Protection Agency
- HDV = Human drinking water value.
- NC = No Criteria
- GSI = Groundwater Surface Water Interface
- GW = Groundwater
- Interstate Technology Regulatory Council (ITRC), November 2017. PFAS -- Per- and Polyfluoroalkyl Substances. Regulations, Guidance and Advisories, Section 4 Tables, Table 4-2.
- EPA RSLs, May 2018. Calculated using the EPA RSL calculator with EPA OW RfDs, TR=1E-06, HQ=1.0 and exposure assumptions including residential, composite worker and soil to groundwater. Updated November 2019.
- Alaska Department of Environmental Conservation, July 2017. 18 AAC 75. *Oil and Other Hazardous Substances Pollution Control* as amended through October 27, 2018 (p 79). Accessed January 2, 2020.
- Delaware Department of Natural Resources and Environmental Control Site Investigation and Restoration Section (DNREC-SIRS). *Guidance for Notification Requirements*. January 2013, updated October 2017 (p 35).
- Delaware Department of Natural Resources and Environmental Control Site Investigation and Restoration Section (DNREC-SIRS). Screening Level Table. January 2013, updated February 2018 (p 23). Accessed January 2, 2020.
- Iowa Department of Natural Resources (IDNR). Statewide Standards. Accessed January 2, 2020.
- Maine Department of Environmental Protection (DEP). *Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances, October 19, 2018* (p 47). Accessed January 2, 2020.
- Michigan Department of Environmental Quality (DEQ). Part 201 Generic Cleanup Criteria and Screening Levels. June 25, 2018. Accessed January 2, 2020.
- Minnesota Pollution Control Agency (PCA) Risk-Based Site Evaluation Guidance, Draft Soil Reference Value (SRV) Technical Support Document and SRV Spreadsheets as of September 2016. Accessed January 2, 2020.
- Nevada Division of Environmental Protection (NDEP). *Basic Comparison Levels*. July 2017. Accessed January 2, 2020.

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- North Carolina Department of Environmental Quality (DEQ). Preliminary Soil Remediation Goals (PSRG) Table. May 2019. Accessed January 2, 2020.
- Texas Commission on Environmental Quality (TCEQ). *Texas Risk Reduction Program (TRRP) Protective Concentration Levels*. Revised April 27, 2018. Accessed January 2, 2020.
- British Columbia Office of Legislative Counsel, Ministry of Attorney General, Victoria, British Columbia. Environmental Management Act. Contaminated Sites Regulation. B.C. Reg. 375/96. Amended January 24, 2019. Accessed December 31, 2019.
- Health Canada. 2019. Summary Table: Health Canada Draft Guidelines, Screening Values and Toxicological Reference Values (TRVs) for Perfluoroalkyl Substances (PFAS). February, 2019.
- Indiana Department of Environmental Management (IDEM). 2019. Screening Level Table A-6. Accessed December 31, 2019. Accessed January 2, 2020.
- Soil analytical results from the investigation were screened against the United States Environmental Protection Agency (USEPA), Regional Screening Level (RSL) for Industrial Soil (TR=1E-06, HQ=1) June 2017.
- Shading indicates values were used to screen soil results from the investigation. See Table 2.

Table A-9
International Soil Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		Australia ⁹				Western Australia ¹⁰	Denmark ¹¹	Norway ¹²	Sweden ¹³																					
		Screening Level				Health-Based Guidance	Health-Based Guidance		Soil Protection										Soil and GW Protection (One Resource)											
		20% of FSANZ TDI	20% of FSANZ TDI	20% of FSANZ TDI	20% of FSANZ TDI				Health Risk Based Guideline Value	Intake of Soil	Skin	Inhalation of Dust	Inhalation of Vapor	Intake of GW as DW	Intake of Plants	Protection of the Environment	Protection of GW	Protection of SW	Preliminary Guideline Value	Health Risk Based Guideline Value	Intake of Soil	Skin	Inhalation of Dust	Inhalation of Vapor	Intake of GW as DW	Intake of Plants	Protection of the Environment	Protection of GW	Protection of SW	Preliminary Guideline Value
Residential	High Density Residential	Industrial/Co mmercial	Urban residential/pu blic open spaces																											
Concentrations in µg/kg																														
PFOA	Perfluorooctanoic acid (C8)	100	20,000	50,000	10,000	40,000	1,300 ***	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFOS	Perfluorooctanesulfonic acid (C8)	9	2,000	20,000	1,000	4,000	390 ***	2.3	31	1,900	6,800	2,100,000	3,600,000	33	600	3	6.6	27	3	11,000	17,000	34,000	21,000,000	36,000,000	--	--	300	21	27	20
PFBS	Perfluorobutanesulfonic acid (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFBA	Perfluorobutanoic acid (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFNA	Perfluorononanoic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFPeA	Perfluoropentanoic acid (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHxA	Perfluorohexanoic acid (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHxS	Perfluorohexanesulfonic acid (C6)	9	2,000	20,000	1,000	4,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFHpA	Perfluoroheptanoic acid (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFOSA	Perfluorooctane sulfonamide (C8)	--	--	--	--	390 ***	390 ***	390 ***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFUnA	Perfluoroundecanoic acid (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDoA	Perfluorododecanoic acid (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDA	Perfluorodecanoic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFDS	Perfluorodecanesulfonic acid (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFTeDA	Perfluorotetradecanoic acid (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFTrDA	Perfluorotridecanoic acid (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PFNS	Perfluorononane sulfonic acid (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
4:2 FTS	Fluorotelomer sulfonate (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
6:2 FTS	Fluorotelomer sulfonate (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
8:2 FTS	Fluorotelomer sulfonate (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11Cl-PF3OL	11-Chloroicosaffluoro-3-oxaundecane-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
9Cl-PF3ON	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
ADONA	4,8-Dioxa-3H-perfluorononanoate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Notes:

1. Standards and guidance values in µg/kg (micrograms per kilogram), parts per billion (ppb)

2. * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.

3. *** = An additive approach is implemented when PFOS, PFOA and PFOSA occur in soil at the same time: PFOA (conc. mg/kg) / 1.3 mg/kg + PFOS (conc. mg/kg) / 0.39 mg/kg + PFOSA (conc. mg/kg) /0.39 mg/kg < 1

4. -- = No criteria or screening level value established.

5. b = Guidance document in draft.

6. DW = Drinking water

7. SW = Surface water

8. GW = Groundwater

9. Australia and New Zealand Heads of Environmental Protection Agencies (HEPA). *PFAS National Environmental Management Plan*. January, 2018. Accessed January 2, 2020.

10. Government of Western Australia Department of Environment Regulation (DER). 2017. Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS). Contaminated Sites Guidelines. January. Accessed January 2, 2020.

11. Danish Ministry of the Environment, EPA. *Perfluoroalkylated substances. Evaluation of health hazards and proposal of a health based quality criterion for drinking water, soil and ground water*. Environmental Project No. 1665, 2015. Accessed January 2, 2020.

12. NIVA og NGI. 2014. Kvalitetssikring av miljøkvalitetsstandarder. September. Accessed May 31, 2019.

13. Swedish Geotechnical Institute. *Preliminary guideline values for highly fluorinated substances (PFAS) in soil and groundwater*. 2015. Accessed May 31, 2019.

Table A-10
North American Sediment Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: January 2, 2020

		Maine ²
		Screening Level
		Recreational Sediment
		Concentrations in µg/kg
PFOA	Perfluorooctanoic acid (C8)	5,700
PFOS	Perfluorooctanesulfonic acid (C8)	5,700
PFBS	Perfluorobutanesulfonic acid (C4)	5,700,000
PFBA	Perfluorobutanoic acid (C4)	--
PFNA	Perfluorononanoic acid (C9)	--
PFPeA	Perfluoropentanoic acid (C5)	--
PFHxA	Perfluorohexanoic acid (C6)	--
PFHxS	Perfluorohexanesulfonic acid (C6)	--
PFHpA	Perfluoroheptanoic acid (C7)	--
PFOSA	Perfluorooctane sulfonamide (C8)	--
PFUnA	Perfluoroundecanoic acid (C11)	--
PFDoA	Perfluorododecanoic acid (C12)	--
PFDA	Perfluorodecanoic acid (C10)	--
PFDS	Perfluorodecanesulfonic acid (C10)	--
PFTeDA	Perfluorotetradecanoic acid (C14)	--
PFTrDA	Perfluorotridecanoic acid (C13)	--
PFNS	Perfluorononane sulfonic acid (C9)	--
MeFOSAA	Methyl perfluorooctanesulfonamidoacetic acid (C8)	--
EtFOSAA	Ethyl perfluorooctanesulfonamidoacetic acid (C8)	--
4:2 FTS	Fluorotelomer sulfonate (C4)	--
6:2 FTS	Fluorotelomer sulfonate (C6)	--
8:2 FTS	Fluorotelomer sulfonate (C8)	--
11CI-Pf3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B)	--
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B)	--
ADONA	4,8-Dioxa-3H-perfluorononanoate	--
HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)	--

Notes:

- Standards and guidance values in µg/kg (micrograms per kilogram), parts per billion (ppb)
- Maine Department of Environmental Protection (DEP). *Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances*, October 19, 2018 (p 47). Accessed January 2, 2020.

Appendix B

Groundwater Sampling Logs



3015 SW First Avenue
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(503) 924-4704 Phone
(503) 943-6357 Fax

PROJECT NUMBER 1264-06
FIELD REPORT NUMBER _____
PAGE 1 OF _____
DATE 11/6/19

PROJECT	<u>PDX FTF</u>	ARRIVAL TIME	<u>0815</u>
LOCATION	<u>PDX</u>	DEPARTURE TIME	<u>1630</u>
CLIENT	<u>POP</u>	WEATHER	<u>overcast</u>
PURPOSE OF OBSERVATIONS	<u>Sample GWM wells</u>		
APEX REPRESENTATIVE	<u>KK</u>	APEX PROJECT MANAGER	<u>HG/AR</u>
CONTRACTOR	<u>—</u>	PERMIT NO.	<u>—</u>
CONTRACTOR REP.	<u>—</u>	H&S REVIEW	<u>yes</u>

Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representative do not relieve any contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, and sequence of construction. Unless signed by the Ash Creek Associates Project Manager, this report is preliminary. A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those included in a preliminary report.

0815 - On site, call OPS, set up for sampling.

Begin Sampling GWM wells. Separate Purge water
MW-24 dewatered, wait for Recharge.
Collect DUP-1 (mw-28) and DUP-2 (mw-31)
MW-31 dewatered, wait for recharge to sample

1600 - Go Back to MW-24 and collect sample. Slow
Recharge rate.

1610 - Finish sampling / Pack up truck

1620 - Drop off Purge water at IDW Drums. Separate
clean and dirty purge water.

1630 - call OPS / OFF site

BY

APEX REPRESENTATIVE

REVIEWED BY

APEX PROJECT MANAGER

APEX

Well I.D.	MW-24	Job Number:	1264-06
Client:	POP	Date:	11/6/19
Project:	PDX FTF	Sampler:	KK
Weather:	overcast	Time In/Out:	

Well Depth:			Well Diameter:	8"	Water Height	
Depth to Water:	19.90		Screened Interval:		x Multiplier	
Water Column Length:			Depth to Free Product:		x Casing Volumes	
Purge Volume:			Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

Purge Method:	P. Pump	Pump Intake Depth:	ms	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

SAMPLING DATA

Sample ID:	MW-24	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1600	Final Depth to Water:	20.38	Did Well Dewater?	yes	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

well dewatered. wait for recharge to collect sample.

APEX

Well I.D.	DW-3	Job Number:	1264-06
Client:	POP	Date:	11/6/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun, Wind	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	12.01		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—	

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	ADPF	

[illegible]

SAMPLING DATA

Sample ID:	DW-3	Sampling Flow Rate	0.20	Analytical Laboratory:	vista	
Sample Time:	1530	Final Depth to Water:	11.99	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	DW-1	Job Number:	1264-04
Client:	POP	Date:	11/6/19
Project:	PDX FTF	Sampler:	K/K
Weather:	sun	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	15.00		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	ms	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	DW-1	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1500	Final Depth to Water:	15.28	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

COMMENTS	

APEX

Well I.D.	MW-30	Job Number:	1264-06
Client:	POP	Date:	11/6/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	17.25		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

SAMPLING DATA

Sample ID:	MW-30	Sampling Flow Rate	0.20	Analytical Laboratory:	Usta	
Sample Time:	1425	Final Depth to Water:	17.25	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PRAS	yes <u>no</u>	<u>—</u>	<u>—</u>	<u>—</u>
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-32	Job Number:	1264-06
	Client:	POP	Date:	11/6/19
	Project:	PDX FTF	Sampler:	KIC
	Weather:	Sun	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	17.76	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		P. Pump		Pump Intake Depth:		MS		Comments			
Sampling Method:		LF		Tubing Type:		HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1323	—	—	17.80	0.20	6.7	16.2	256.4	5.84	51.1	—	C
1326	—	—	17.80	1	6.6	15.0	253.8	5.28	46.4	—	C
1329	—	—	17.80	1	6.5	14.9	253.5	5.16	42.1	—	C
1332	—	—	17.80	1	6.5	14.9	252.6	5.06	38.7	—	C

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-32	Sampling Flow Rate:	0.20	Analytical Laboratory:	Vista	
Sample Time:	1335	Final Depth to Water:	17.75	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	—	yes (no)	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

APEX

Well I.D.	MW-31	Job Number:	1264-06
Client:	POP	Date:	11/6/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	15.08		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	ms	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

SAMPLING DATA

Sample ID:	MW-31	Sampling Flow Rate	0.20	Analytical Laboratory:	Urista	
Sample Time:	1300	Final Depth to Water:	16.90	Did Well Dewater?	yes	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
4 x 250	—	PFAS	yes no	—	—	DUP-2
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

Dewatered at end of parameters, wait for Recharge to sample

Well I.D.	MW-29	Job Number:	1264-06
Client:	POP	Date:	11/6/19
Project:	PDX FTF	Sampler:	KIC
Weather:	Sun	Time In/Out:	

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	5.82	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

SAMPLING DATA

Sample ID:	MW-29	Sampling Flow Rate	0.20	Analytical Laboratory:	U:sta	
Sample Time:	1155	Final Depth to Water:	5.83	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes ☒ no	—	—	—
			yes ☐ no			
			yes ☐ no			
			yes ☐ no			
			yes ☐ no			
			yes ☐ no			

COMMENTS

Well I.D.	MW-28	Job Number:	1264-04
Client:	POP	Date:	11/6/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	8.31		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

SAMPLING DATA

Sample ID:	MW-28	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1105	Final Depth to Water:	11.77	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
4 x 250	—	PFAS	yes ☒ no	—	—	DUP-1
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

WELL MONITORING DATA SHEET

	Well I.D.	MW-26	Job Number:	1264-06
	Client:	POP	Date:	11/6/19
	Project:	PDX FTF	Sampler:	KE
	Weather:	overcast	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	12.38	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

PURGING DATA

Purge Method:		P. Pump		Pump Intake Depth:		MS		Comments			
Sampling Method:		LF		Tubing Type:		HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	← Stabilization Criteria
958	—	—	12.80	0.20	6.6	12.9	588	3.69	21.7	—	C
1001	—	—	13.38	1	6.6	13.0	603	1.80	-5.1	—	C
1004	—	—	14.03	1	6.6	13.1	608	1.65	-8.8	—	C
1007	—	—	14.74	1	6.5	13.2	612	1.52	-10.8	—	C

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-26	Sampling Flow Rate	0.20	Analytical Laboratory:	Uista
Sample Time:	1010	Final Depth to Water:	15.40	Did Well Dewater?	NO
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD
2 x 250	—	PFAS	yes <u>no</u>	—	—
			yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

Well I.D.	MW - 25	Job Number:	1264-06
Client:	POP	Date:	11/6/19
Project:	PD2 FTF	Sampler:	KK
Weather:	overcast	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	18.80		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	Sampling Flow Rate	Analytical Laboratory:				
Sample Time:	Final Depth to Water:	Did Well Dewater?				
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	-	PFA5	yes no	-	-	-
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS



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PROJECT NUMBER 1264-06
FIELD REPORT NUMBER _____
PAGE 1 OF 1
DATE 11/7/19

PROJECT	<u>PDX FTF</u>	ARRIVAL TIME	<u>0800</u>
LOCATION	<u>PDX</u>	DEPARTURE TIME	<u>1605</u>
CLIENT	<u>POP</u>	WEATHER	<u>Part sun</u>
PURPOSE OF OBSERVATIONS	<u>Sample GWM wells</u>		
APEX REPRESENTATIVE	<u>KK</u>	APEX PROJECT MANAGER	<u>HG/AR</u>
CONTRACTOR	<u>—</u>	PERMIT NO.	<u>—</u>
CONTRACTOR REP.	<u>—</u>	H&S REVIEW	<u>yes</u>

Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representative do not relieve any contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, and sequence of construction. Unless signed by the Ash Creek Associates Project Manager, this report is preliminary. A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those included in a preliminary report.

0800 - on site, call OPS, Review safety, set up for sampling.

0830 - Begin sampling Gwm wells. Coordinate with OPS to sample MW-18 + MW-19.

1530 - Finish sampling

1540 - collect Equip Blank

1550 - Drop off Purge water at IDW Drum, pack up truck.

1605 - call OPS / OFF site

BY

REVIEWED BY

KK
APEX REPRESENTATIVE

APEX PROJECT MANAGER

Well I.D.	MW-21	Job Number:	1264-06
Client:	POD	Date:	11/7/19
Project:	PDX FTF	Sampler:	KK
Weather:		Time In/Out:	

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	11.10	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

SAMPLING DATA

Sample ID:	MW-21	Sampling Flow Rate:	0.20	Analytical Laboratory:	Vista	
Sample Time:	1520	Final Depth to Water:	11.20	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2X 250	—	PFAS	yes <u>no</u>	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-20	Job Number:	1264-06
Client:	POP	Date:	11/7/19
Project:	PDX FTF	Sampler:	KK
Weather:		Time In/Out:	

WELL DATA						
Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	5.80		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	MW-20	Sampling Flow Rate:	0.20	Analytical Laboratory:	Vista	
Sample Time:	1445	Final Depth to Water:	6.23	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-19	Job Number:	1264-06
Client:	POP	Date:	11/7/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:			Well Diameter:	2"	Water Height	—
Depth to Water:	4.55		Screened Interval:	—	x Multiplier	—
Water Column Length:			Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:			Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

SAMPLING DATA

Sample ID:	MW-19	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1405	Final Depth to Water:	5.32	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 X 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-18	Job Number:	1264-06
	Client:	POP	Date:	11/7/19
	Project:	PDX FTF	Sampler:	
	Weather:	Sun	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	8.13	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	P. Pump				Pump Intake Depth:	MS				Comments	
Sampling Method:	LF				Tubing Type:	HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1321	—	—	8.48	0.20	6.12	15.5	117.8	2.54	80.0	—	C
1324	—	—	9.02	—	5.95	15.4	114.8	1.19	86.3	—	C
1327	—	—	9.40	—	5.90	15.5	114.3	1.11	92.3	—	C
1330	—	—	9.58	—	5.88	15.3	113.4	0.99	96.3	—	C

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-18	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1335	Final Depth to Water:	9.20	Did Well Dewater?	NO	
# Containers/Type	2 x 250	Preservative	—	Analysis/Method	PFAS	
				Field Filtered	yes no	
					yes no	
					yes no	
					yes no	
					yes no	
					yes no	

COMMENTS

APEX

Well I.D.	MW-22	Job Number:	1264-06
Client:	POP	Date:	11/7/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	10.79		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

SAMPLING DATA

Sample ID:	MW-22	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1235	Final Depth to Water:	10.88	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-23	Job Number:	1264-06
Client:	POP	Date:	11/7/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	13.62		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

SAMPLING DATA

Sample ID:	mw-23		Sampling Flow Rate	0.20		Analytical Laboratory:	Vista	
Sample Time:	1155		Final Depth to Water:	15.85		Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID		
2 x 250	—	PFAS	yes no	—	—	—		
			yes no					
			yes no					
			yes no					
			yes no					
			yes no					

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-17	Job Number:	1264-06
	Client:	POP	Date:	11/7/19
	Project:	PDX FTF	Sampler:	KK
	Weather:	Sun	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	7.88	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	P. Pump				Pump Intake Depth:	MS				Comments		
Sampling Method:	LF				Tubing Type:	HDPE						
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria	
1058	—	—	8.20	0.20	6.18	13.7	184.1	2.25	71.0	—	C	
1101	—	—	8.70	1	6.16	13.8	183.3	0.56	68.6	—	C	
1104	—	—	9.09	1	6.12	13.8	180.5	0.35	68.5	—	C	
1107	—	—	9.35	1	6.10	13.8	179.3	0.28	67.8	—	C	

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-17	Sampling Flow Rate:	0.20	Analytical Laboratory:	Vista
Sample Time:	1110	Final Depth to Water:	9.02	Did Well Dewater?	NO
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD
2 x 250	—	PFAS	yes no	—	—
			yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

WELL MONITORING DATA SHEET

	Well I.D.	MW-16	Job Number:	1264-06
	Client:	POP	Date:	11/7/19
	Project:	PDX FTF	Sampler:	KIC
	Weather:	Sun	Time In/Out:	

WELL DATA

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	6.78	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

PURGING DATA

Purge Method:	P. Pump				Pump Intake Depth:	MS				Comments	
Sampling Method:	LF				Tubing Type:	HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1016	—	—	6.86	0.20	6.34	14.3	103.7	2.49	66.0	—	SC
1019	—	—	6.88	1	6.03	14.8	101.0	0.40	74.5	—	SC
1022	—	—	6.88	1	6.00	14.8	100.0	0.29	75.7	—	AC
1025	—	—	6.88	1	6.00	14.8	100.3	0.28	75.3	—	C

Clarity: VC = very cloudy, CI = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-16	Sampling Flow Rate:	0.20	Analytical Laboratory:	Vista
Sample Time:	1030	Final Depth to Water:	6.80	Did Well Dewater?	NO
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD
2 x 250	—	PFAS	yes no	—	—
			yes no		
			yes no		
			yes no		
			yes no		
			yes no		

COMMENTS

Well I.D.	MW-27	Job Number:	1264-06
Client:	POP	Date:	11/7/19
Project:	PDY FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	12.39	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	MW-27	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	940	Final Depth to Water:	15.91	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PTAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-33	Job Number:	1264-06
Client:	POP	Date:	11/7/19
Project:	PDX FTF	Sampler:	KK
Weather:	Part sun	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	17.20		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

SAMPLING DATA

Sample ID:	MW-33	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	855	Final Depth to Water:	17.46	Did Well Dewater?	no	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS



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Portland, Oregon 97201-4707
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(503) 943-6357 Fax

PROJECT NUMBER 1264-06
FIELD REPORT NUMBER _____
PAGE 1 OF 1
DATE 11/8/19

PROJECT	<u>PDX FTF</u>	ARRIVAL TIME	<u>0830</u>
LOCATION	<u>PDX</u>	DEPARTURE TIME	<u>1540</u>
CLIENT	<u>POP</u>	WEATHER	<u>sun</u>
PURPOSE OF OBSERVATIONS	<u>Sample GW and surface water</u>		
APEX REPRESENTATIVE	<u>KK</u>	APEX PROJECT MANAGER	<u>HG/AR</u>
CONTRACTOR	<u>—</u>	PERMIT NO.	<u>—</u>
CONTRACTOR REP.	<u>—</u>	H&S REVIEW	<u>yes</u>

Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representative do not relieve any contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, and sequence of construction. Unless signed by the Ash Creek Associates Project Manager, this report is preliminary. A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those included in a preliminary report.

0830 - On site, call OPS, prep for sampling.
0850 - Begin sampling GWM wells
1400 - Finish GWM sampling
1410 - Pack up truck / Drop off purge water
1420 - Equip Blank 3
1435 - Collect OFIN-NW
1450 - call OPS / OFF site Drive to surface water locations.
1510 - collect SW-2
1530 - collect SW-3
Ditch B was Dry, did not sample.
1540 - Pack up / OFF site

BY

REVIEWED BY

KK
APEX REPRESENTATIVE

HG/AR
APEX PROJECT MANAGER

Well I.D.	MW-4	Job Number:	1264-06
Client:	POP	Date:	11/8/19
Project:	PDX FTF	Sampler:	KE
Weather:	Sun	Time In/Out:	

Well Depth:	—	Well Diameter:	—	Water Height	—
Depth to Water:	9.60	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	MW-4	Sampling Flow Rate	0.20	Analytical Laboratory:	Uista	
Sample Time:	1345	Final Depth to Water:	9.90	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
4 x 250	—	PRAS	yes ☒ no	—	—	DUP-3
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-3	Job Number:	1264-06
Client:	POP	Date:	11/8/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—	Well Diameter:	4"	Water Height	—
Depth to Water:	10.01	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	MW-3	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1305	Final Depth to Water:	10.33	Did Well Dewater?	no	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

mw - 1

1264-06

POP

11/8/19

PDX FTE

KIC

Sun

Time In/Out:

Well Depth:	—	Well Diameter:	—	Water Height	—
Depth to Water:	9.70	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	MW-1	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1230	Final Depth to Water:	9.98	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-10A	Job Number:	1264-06
Client:	POP	Date:	11/8/19
Project:	PDX PTF	Sampler:	KIC
Weather:	sun	Time In/Out:	

Well Depth:	_____		Well Diameter:	_____	Water Height	_____
Depth to Water:	7.02		Screened Interval:	_____	x Multiplier	_____
Water Column Length:	_____		Depth to Free Product:	_____	x Casing Volumes	_____
Purge Volume:	_____		Free Product Thickness:	_____	= Purge Volume	_____
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	_____

[illegible]

SAMPLING DATA

Sample ID:	MW-10A	Sampling Flow Rate:	0.20	Analytical Laboratory:	Vista	
Sample Time:	1150	Final Depth to Water:	7.56	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PKAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-14	Job Number:	1264-06
Client:	POP	Date:	11/8/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—	Well Diameter:	4"	Water Height	—
Depth to Water:	5.07	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	MW-14	Sampling Flow Rate:	0.20	Analytical Laboratory:	Vista	
Sample Time:	1110	Final Depth to Water:	5.12	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes <u>no</u>	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-8	Job Number:	1264-06
Client:	POP	Date:	11/8/19
Project:	PDX FTF	Sampler:	KK
Weather:	Sun	Time In/Out:	

Well Depth:	—	Well Diameter:	4"	Water Height	—
Depth to Water:	10.02	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

Purge Method:	P. Pump	Pump Intake Depth:	ms	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	MW-8	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	1028	Final Depth to Water:	10.41	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	MW-15	Job Number:	1264-06
Client:	POP	Date:	11/8/19
Project:	PDX FTF	Sampler:	ICK
Weather:	sun	Time In/Out:	

Well Depth:	—	Well Diameter:	2"	Water Height	—
Depth to Water:	12.52	Screened Interval:	—	x Multiplier	—
Water Column Length:	—	Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—	Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters

Purge Method:	P. Pump	Pump Intake Depth:	MS	Comments
Sampling Method:	LF	Tubing Type:	HDPE	

[illegible]

SAMPLING DATA

Sample ID:	MW-15	Sampling Flow Rate:	0.20	Analytical Laboratory:	Vista	
Sample Time:	945	Final Depth to Water:	12.90	Did Well Dewater?	NO	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PPAS	yes (no)	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Well I.D.	DW-2	Job Number:	1264-06
Client:	POP	Date:	11/8/19
Project:	PDX FTF	Sampler:	KIC
Weather:	Sun	Time In/Out:	

Well Depth:	—		Well Diameter:	2"	Water Height	—
Depth to Water:	12.19		Screened Interval:	—	x Multiplier	—
Water Column Length:	—		Depth to Free Product:	—	x Casing Volumes	—
Purge Volume:	—		Free Product Thickness:	—	= Purge Volume	—
Water Height Multipliers (gal)		1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	—

[illegible]

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

Sample ID:	DW-2	Sampling Flow Rate	0.20	Analytical Laboratory:	Vista	
Sample Time:	912	Final Depth to Water:	12.94	Did Well Dewater?	no	
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2 x 250	—	PFAS	yes no	—	—	—
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

3015 SW First Avenue
Portland, Oregon 97201-4707
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(503) 943-6357 Fax

PROJECT NUMBER 1264-06
FIELD REPORT NUMBER _____
PAGE 1 OF 1
DATE 10/28/19

PROJECT	PDX FTF	ARRIVAL TIME	0830
LOCATION	PDX	DEPARTURE TIME	1545
CLIENT	POP	WEATHER	Sunny 33°
PURPOSE OF OBSERVATIONS	GW well gauging event		
APEX REPRESENTATIVE	KK	APEX PROJECT MANAGER	AR/HG
CONTRACTOR	—	PERMIT NO.	—
CONTRACTOR REP.	—	H&S REVIEW	yes

Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representative do not relieve any contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, and sequence of construction. Unless signed by the Ash Creek Associates Project Manager, this report is preliminary. A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those included in a preliminary report.

0830 - on site, call OPS and talk about schedule for next two weeks, wait for escort for MW-18 + MW-19.
Review HASP.

0920 - start popping well caps and gauging.

~~1400~~ - meet w/ matt and milce shield S.
1415

1540 - Finish ganging / call ops

1545 - OFF site

BY

Kyle
APEX REPRESENTATIVE

REVIEWED BY

APEX PROJECT MANAGER

WELL GAGING DATA SHEET

				Job Number:	1264-06 06		
		Client:	Port of Portland	Date:	10/28/19		
		Project:	PDX FTF	Sampler:	KK		
		Weather:	Sunny	Time In/Out:			
WATER LEVEL DATA							
Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
MW-1	1335	—	9.56				
MW-2	1340	—	10.67				
MW-3	1345	—	9.95				
MW-4	1355	—	9.50				
MW-5	1402	—	11.08				
MW-6	1407	—	9.57				
MW-7	1450	—	10.56				
MW-8	1413	—	10.00				
MW-9	1457	—	7.52				
MW-10A	1503	—	6.93				
MW-11	1510	8.75	8.90		0.15		
MW-12	1516	10.86	10.93		0.07		
MW-13	1220	—	5.80				
MW-14	1211	—	4.98				
MW-15	1230	—	12.37				
MW-16	1243	—	6.69				
MW-17	1254	—	7.82				
MW-18	900	—	7.82				
MW-19	918	—	4.50				
MW-20	946	—	5.62				
MW-21	951	—	11.00				
MW-22	958	—	10.66				
MW-23	1004	—	13.13				
MW-24	1036	—	19.43				
MW-25	1043	—	18.60				
MW-26	1048	—	12.33				
MW-27	1540	—	12.22				
MW-28	1056	—	8.20				
MW-29	1124	—	5.80				
MW-30	1137	—	17.34				
MW-31	1200	—	14.92				
MW-32	1150	—	17.66				

Time In/Out:

[illegible]

Appendix C

Laboratory Quality Assurance/Quality Control Review and Analytical Laboratory Reports

Appendix C – Analytical Laboratory Reports and Quality Assurance / Quality Control Review

1.0 Introduction

This appendix documents the results of a quality assurance/quality control (QA/QC) review of the analytical data for water samples collected at the Portland International Airport Fire Training Facilities, Portland, Oregon. Samples from the Site were analyzed by Vista Analytical Laboratory (Vista) of El Dorado Hills, California. Copies of the analytical laboratory reports are included in this appendix, referenced in Table 1 as follows.

Table 1: Analytical Laboratory Reports

Report	Report Date	Sampling Event
1903989	December 14, 2019	Fourth Quarter 2019 Shallow Groundwater
1903993	December 16, 2019	Fourth Quarter 2019 Shallow Groundwater, Deep Groundwater, Stormwater, and Surface Water

2.0 Data Validation

The QA review outlines the applicable quality control criteria utilized during the data review process, as well as any deviations from those criteria. Examination and validation of the laboratory summary reports include:

- Analytical preparation and quantitation methods;
- Analytical method holding times;
- Field and sampling procedures;
- Sample management;
- Chain of custody handling;
- Detection and reporting limits;
- Analyte identification and quantitation;
- Method blank and equipment blank detections;
- On-going precision and recovery (OPR) to assess laboratory accuracy; and
- Field duplicates to assess sampling and laboratory precision.

The QA/QC review did not include a review of raw data.

Appendix C – Analytical Laboratory Reports and Quality Assurance / Quality Control Review

This QA/QC review documents the relationship between analytical findings and data quality objectives based on precision and accuracy. It also summarizes possible error or bias and the effect on data quality and usability.

The laboratory quality control (QC) samples provided in data packages were used to evaluate laboratory contamination or background interferences, sample preparation efficiency, instrumentation performance and sample matrix interferences. The QC samples provided by the analytical laboratories include: method blanks and ongoing precision and recovery (OPR). Surrogates and labeled standards were also analyzed to assess sample preparation efficiency and matrix interferences.

2.1 Data Qualifiers

Any data that is found to have possible bias or error was qualified and flagged. The following are flags used in this QA/QC review and data tables.

Table 2: Qualifier Flags

Q	Identification of analyte could not be confirmed. Ion ratio exceeded control limit.
J	The reported concentration is an estimated value.
D	The RPD between the primary and field duplicate sample exceeded the 30 percent control limit.

3.0 Analytical Methods

Chemical analyses consisted of the following:

- Per- and polyfluorinated alkyl substances (PFAS) by the Isotope Dilution Method (formerly Modified EPA Method 537).

The samples were extracted and analyzed for a select list of PFAS using the PFAS Isotope Dilution Method. The results for PFHxS, PFOA, PFOS, MeFOSAA, and EtFOSAA include both linear and branched isomers. Results for all other PFAS include linear isomers only.

Vista is certified for the Isotope Dilution Method by the National Environmental Laboratory Accreditation Program (NELAP) (under Modified EPA Method 537).

Appendix C – Analytical Laboratory Reports and Quality Assurance / Quality Control Review

4.0 Data Quality Assurance Review

The general QA objectives for this project were to develop and implement procedures for obtaining, evaluating, and confirming the usability of data of a specified quality. To collect such information, analytical data must have an appropriate degree of accuracy and reproducibility, samples collected must be representative of actual field conditions, and samples must be collected and analyzed using unbroken chain-of-custody procedures.

Reporting limits and analytical results were compared to cleanup and screening levels for each parameter in the matrix of concern. Precision, accuracy, completeness, and comparability parameters used to indicate data quality are defined below.

4.1 Field and Sampling Procedures

Apex collected groundwater samples from select overbank deposit (OD) wells and upper Columbia River Sand Aquifer (CRSA) wells in accordance with the low-flow sampling techniques. Groundwater samples were collected using dedicated PFAS-free tubing (e.g. high-density polyethylene [HDPE]) and a peristaltic pump). Groundwater was purged prior to sampling and groundwater field parameters were measured for pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), specific conductance, and temperature using a flow cell connected to the discharge tubing of the sample pump. Turbidity of the water was monitored visually with color and clarity being recorded on the sampling data sheet. Purging was considered complete when the water quality parameters stabilized to within ten (10) percent and the water was visually clear for three consecutive three-minute intervals.

Stormwater and surface water sample were collected using a decontaminated telescoping swing and transferred to the sample container.

To prevent cross-contamination between sampling events, clean, dedicated sampling equipment (e.g., groundwater sampling tubing) was used for each sampling event and was discarded after use. Cleaning of non-disposable items (i.e., field meter, telescoping swing sampler, and water level probe) consisted of washing in a detergent (Alconox®) solution, rinsing with tap water, followed by a PFAS-free water rinse.

Samples were collected in two 250 milliliter (mL) HDPE containers per sample location. Container lids were also constructed out of HDPE. All sample containers were provided by the laboratory and certified PFAS-free. Labels containing the sample identification, sample date, and sample time were affixed to containers. This same identification information was recorded on the chain of custody document. After collection, sample containers were placed within one Ziploc® bag per sample location and chilled on wet ice.

To avoid PFAS contamination, sampling personnel avoided using items containing polytetrafluoroethylene (PTFE, also known as Teflon), low-density polyethylene (LDPE) or polypropylene as well as other items that

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contain PFAS, such as aluminum foil, post-it notes, waterproof field books, markers, chemical ice packs (e.g., blue ice), certain decontamination soaps, and certain product packaging (e.g., such as that found on pre-wrapped foods and snacks). Similarly, many clothing items contain PFAS, such as those coated with Teflon or incorporating a Gore-Tex membrane. Clothing items were only worn if they had been washed at least six times. Field personnel avoided the use of cosmetics, moisturizers, and hand cream. Insect repellent and sunscreen were avoided and alternative skins barriers (e.g. long sleeve clothing, wide-brimmed hats, etc.) were used. PFAS contamination prevention protocols were reviewed with subcontractors and personnel daily during the field activities. Before any samples are collected, the sample handler washed their hands and wore nitrile gloves while collecting and sealing sample containers

4.2 Sample Management

Chain of custody documents were implemented for handling and managing samples. The chain of custody documents were appropriately filled out with sample identification, sample date, sample time, analysis to be performed, and were relinquished by the Apex Companies sampler and received by Vista. Samples were shipped to Vista via FedEx and were packed with wet ice in two ice chests. Upon receipt by the laboratory, sample temperature was recorded as 1.7 degrees Celsius (°C) and 1.9 °C. There were no significant discrepancies between sample container labels and information documented on the chain of custody.

Upon receipt the laboratory noted particulate matter in groundwater collected from wells MW-1, MW-3, MW-4, MW-8, MW-10A, MW-16, MW-19, MW-21, MW-22, MW-24, MW-25, MW-27, MW-28, MW-29, DW-1, DW-2, DW-3, DUP-1 (MW-28), DUP-3 (MW-4), SW-3, and OF1N-NW that required centrifuging prior to extraction. Centrifuging is a standard practice when extracting PFAS samples since particulates will clog the solid-phase extraction (SPE) cartridge. If SPE cartridges are clogged, it interferes with the extraction process and lowers the recoveries of the internal standards. The solids from the centrifuging are also rinsed in methanol, which is included in the extraction. The PFAS reported by the laboratory are almost exclusively found in the aqueous portion of the samples. The longer carbon chain PFAS will sorb more to the particulate; however, this will also result in lower recoveries for longer-chain internal standards.

4.3 Holding Times

The holding time is the minimum amount of time the sample can be stored before analytes start to degrade and are not representative of initial sampling concentrations. Water samples to be analyzed for PFAS should be extracted within 14 days from collection. Extracts can be stored up to 28 days before analysis. Samples were extracted and analyzed within the method specified holding times.

4.4 Reporting Limits

Reporting limits are the lowest concentration an instrument is capable of accurately detecting an analyte. They are determined by the laboratory and are based on instrumentation capabilities, the matrix of field

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samples, sample preparation procedures and EPA suggested reporting limits. Reporting limits for PFAS were consistent with historical data and below promulgated screening values.

4.5 Analyte Identification and Quantitation

For analysis of PFAS, the recovery of some labeled standards was outside of control limits. Labeled standards are spiked directly into samples before preparation to determine matrix interferences and concentration of analytes. Recovery of these labeled standards automatically corrects sample concentration due to isotope dilution. Data quality is not considered affected if the signal-to-noise ratio is greater than 10:1, which was achieved. No data is flagged in the data table.

Ion ratios were outside of control limits for the following samples: PFDA from wells MW-1, DUP-1 (MW-28), and SW-3; PFNS from wells MW-1 and DUP-3 (MW-4); PFHpS from wells MW-14 and MW-31; PFHxS from wells MW-16 and MW-21; PFHxA from well MW-20; PFOS from wells MW-23, DUP-1 (MW-28), and DUP-2 (MW-31); PFOSA from well MW-29; PFNA from well MW-31; and PFPeS from SW-3. Ion ratios help to identify compounds in complex matrices. When ion ratios are exceeded, the positive identification for the analyte is not confirmed, and the analyte is only suspected as being present in the sample. These results are 'Q' flagged in the table as analytes that are suspected to be present, but the identification could not be confirmed with ion ratios.

4.6 Method Blanks

A method – or laboratory – blank is a quality control sample prepared by the laboratory from an analyte-free matrix and analyzed in an analytical batch along with environmental and other QC samples. It is used to assess laboratory contamination or background interferences. PFAS were not detected in analytical batch method blanks.

4.7 Equipment Blank

An equipment blank is a sample of analyte-free water poured over or through decontaminated field sampling equipment during a sampling event. Equipment blanks assess contamination from the total sampling, sample preparation, and measurement process when decontaminated sampling equipment is used to collect samples.

A total of three equipment blanks were analyzed. Each were prepared at the end of every sampling day. Three equipment blanks were analyzed for PFAS. The equipment blank collected November 6, 2019 had concentrations of PFOS and 6:2 FTS above the reporting limit at 3.53 ng/L and 2.35 ng/L, respectively. Concentrations of PFOs and 6:2 FTS for samples collected on November 6, 2019 were within historical ranges and no anomalous trace detections for these analytes were observed. Additionally, the first groundwater sample collected on November 7, 2019 (from well MW-33) was not detected for PFOS and 6:2 FTS; therefore,

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no sample concentrations were affected by the potential contamination found in the equipment blank on November 6, 2019.

4.8 Accuracy

Accuracy compares the accepted reference concentration of an analyte to the concentration determined analytically. Accuracy is measured as a percent recovery. This recovery must be within a certain range – or control limit – for the data in an analytical batch to be considered acceptable. The analytical laboratory provides quality control samples and surrogates to help determine the accuracy and acceptability of the data reported. These quality control samples and surrogates are discussed below.

4.8.1 Ongoing Precision and Recovery (OPR)

Ongoing precision and recovery (OPR) quality control samples were analyzed in place of LCS/LCSDs for PFAS analysis. Laboratory control samples (LCS) and laboratory control duplicate samples (LCSD) were analyzed by the laboratory to assess the accuracy of the analytical methods. The LCS and LCSD are prepared from an analyte-free matrix that is spiked with known levels of compounds of concern. The concentrations are measured and compared to the known spiked levels; expressed as a percent recovery. This percent recovery must be within method or laboratory defined control limits for data to be considered acceptable. Analytes were recovered within OPR quality control limits.

4.9 Precision

Precision is measured by how close values of duplicate analyses are to each other. These duplicate analyses are prepared from separate aliquots of the same sample and are analyzed at the same (or similar) time. Precision in the field ensures that samples taken are representative of field concentrations; this is demonstrated by field duplicates. Analytical precision is the ability of the laboratory to reproduce results that are similar to each other; this is measured through duplicate analysis of environmental and batch QC samples. Precision is estimated by the relative percent difference (RPD) between the original analysis and the duplicate analysis.

4.9.1 Field Duplicate

A field duplicate is a second field sample collected from a selected sample location. Field duplicate samples serve as a check on laboratory precision, sampling quality, as well as potential variability of the sample matrix. The field duplicate is analyzed and compared to the original sample to assess precision. This comparison can be expressed by the RPD between the original and duplicate samples. Field duplicate samples are controlled if the reported result is greater than five times the reporting limit. Field duplicate samples were collected from wells MW-4, MW-28, and MW-31. RPD values exceeded the 30 percent control limit for PFOS and 6:2 FTS for well MW-4. The RPD exceedances for groundwater samples collected from well MW-4 are

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likely due to the large dilution performed for PFOS and 6:2 FTS. These results are not flagged due to the known decrease in precision when dilutions are performed.

5.0 Conclusion

In conclusion, the QA objectives have been met and the data are of sufficient quality for use in this project.



December 14, 2019

Vista Work Order No. 1903989

Ms. Heather Gosack
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201

Dear Ms. Gosack,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 12, 2019 under your Project Name 'PDX Fire Training Facility'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1903989

Case Narrative

Sample Condition on Receipt:

Twenty groundwater samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The collection time for sample "MW-3" was listed as 1305. The collection time has been reported as 12:30, as it was listed on the CoC.

Analytical Notes:

PFAS Isotope Dilution Method

The following samples contained particulate and were centrifuged prior to extraction:

<u>Laboratory ID</u>	<u>Sample Name</u>
1903989-01	MW-1
1903989-02	MW-3
1903989-03	MW-4
1903989-04	MW-8
1903989-05	MW-10A
1903989-08	MW-16
1903989-11	MW-19
1903989-13	MW-21
1903989-14	MW-22
1903989-16	MW-24
1903989-17	MW-25
1903989-19	MW-27
1903989-20	MW-28

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method. The results for PFHxS, PFOA, PFOS, MeFOSAA, and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each of the preparation batches. No analytes were detected in the Method Blanks above the Reporting Limit. The OPR recoveries were within the method acceptance criteria.

Due to the high levels of target analytes the Reporting Limit has been adjusted to 2ng/L.

The dilutions for 6:2 FTS on samples "MW-3" and "MW-4" were prepared using standard addition.

The internal standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1903989-03	MW-4	PFAS Isotope Dilution Method	13C2-PFHxA	H	223
1903989-03	MW-4	PFAS Isotope Dilution Method	13C8-PFOS	H	37.2
1903989-20	MW-28	PFAS Isotope Dilution Method	13C3-PFBA	H	44.2
1903989-20	MW-28	PFAS Isotope Dilution Method	13C2-PFOA	H	140

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1903989-01	MW-1	08-Nov-19 12:30	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-02	MW-3	08-Nov-19 13:05	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-03	MW-4	08-Nov-19 13:45	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-04	MW-8	08-Nov-19 10:28	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-05	MW-10A	08-Nov-19 11:50	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-06	MW-14	08-Nov-19 11:10	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-07	MW-15	08-Nov-19 09:45	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-08	MW-16	07-Nov-19 10:30	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-09	MW-17	07-Nov-19 11:10	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-10	MW-18	07-Nov-19 13:35	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-11	MW-19	07-Nov-19 14:05	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-12	MW-20	07-Nov-19 14:45	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-13	MW-21	07-Nov-19 15:20	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-14	MW-22	07-Nov-19 12:35	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-15	MW-23	07-Nov-19 11:55	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-16	MW-24	06-Nov-19 16:00	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-17	MW-25	06-Nov-19 09:35	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-18	MW-26	06-Nov-19 10:10	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-19	MW-27	07-Nov-19 09:40	12-Nov-19 10:00	HDPE Bottle, 250 mL
1903989-20	MW-28	06-Nov-19 11:05	12-Nov-19 10:00	HDPE Bottle, 250 mL

Vista Project: 1903989

Client Project: PDX Fire Training Facility

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1903989-20	MW-28	06-Nov-19 11:05	12-Nov-19 10:00	HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Aqueous	Lab Sample:	B9K0126-BLK1	Column:	BEH C18
Project:	PDX Fire Training Facility						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFPeA	2706-90-3	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFBS	375-73-5	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
4:2 FTS	757124-72-4	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFHxA	307-24-4	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFPeS	2706-91-4	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFHpA	375-85-9	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFHxS	355-46-4	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
6:2 FTS	27619-97-2	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFOA	335-67-1	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFHpS	375-92-8	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFNA	375-95-1	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFOSA	754-91-6	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFOS	1763-23-1	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFDA	335-76-2	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
8:2 FTS	39108-34-4	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFNS	68259-12-1	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
MeFOSAA	2355-31-9	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
EtFOSAA	2991-50-6	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFUnA	2058-94-8	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFDS	335-77-3	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFDoA	307-55-1	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFTTrDA	72629-94-8	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
PFTeDA	376-06-7	ND	2.00		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	87.2	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C3-PFPeA	IS	96.2	60 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C3-PFBS	IS	96.5	60 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C2-4:2 FTS	IS	94.8	20 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C2-PFHxA	IS	94.3	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C4-PFHpA	IS	97.0	60 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C3-PFHxS	IS	93.6	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C2-6:2 FTS	IS	110	40 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C5-PFNA	IS	96.8	50 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C8-PFOSA	IS	56.0	20 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C2-PFOA	IS	91.7	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C8-PFOS	IS	101	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1
13C2-PFDA	IS	83.9	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1

Sample ID: Method Blank					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: B9K0126-BLK1 Column: BEH C18					
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	98.6	40 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1	
d3-MeFOSAA	IS	58.8	50 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1	
13C2-PFUnA	IS	82.3	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1	
d5-EtFOSAA	IS	64.7	50 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1	
13C2-PFDoA	IS	85.0	30 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1	
13C2-PFTeDA	IS	62.2	20 - 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 01:53	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OPR						PFAS Isotope Dilution Method					
Client Data						Laboratory Data					
Name:	Apex Companies, LLC	Matrix:	Aqueous			Lab Sample:	B9K0126-BS1	Column:	BEH C18		
Project:	PDX Fire Training Facility										
Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	40.1	40.0	100	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFPeA	2706-90-3	41.4	40.0	104	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFBS	375-73-5	39.3	40.0	98.3	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
4:2 FTS	757124-72-4	45.8	40.0	115	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFHxA	307-24-4	37.8	40.0	94.4	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFPeS	2706-91-4	42.2	40.0	106	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFHpA	375-85-9	39.5	40.0	98.6	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFHxS	355-46-4	41.3	40.0	103	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
6:2 FTS	27619-97-2	38.8	40.0	97.1	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFOA	335-67-1	40.3	40.0	101	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFHpS	375-92-8	45.3	40.0	113	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFNA	375-95-1	39.2	40.0	98.0	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFOSA	754-91-6	39.5	40.0	98.6	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFOS	1763-23-1	48.3	40.1	121	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFDA	335-76-2	41.3	40.0	103	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
8:2 FTS	39108-34-4	36.9	40.0	92.2	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFNS	68259-12-1	32.3	40.0	80.7	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
MeFOSAA	2355-31-9	45.7	40.0	114	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
EtFOSAA	2991-50-6	41.6	40.0	104	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFUnA	2058-94-8	41.3	40.0	103	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFDS	335-77-3	30.0	40.1	74.7	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFDaA	307-55-1	43.9	40.0	110	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFTTrDA	72629-94-8	39.3	40.0	98.2	60 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
PFTeDA	376-06-7	43.2	40.0	108	70 - 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
Labeled Standards		Type		% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA		IS		88.5	60- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C3-PFPeA		IS		97.1	60- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C3-PFBS		IS		95.1	60- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C2-4:2 FTS		IS		95.1	20- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C2-PFHxA		IS		98.2	70- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C4-PFHpA		IS		95.5	60- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C3-PFHxS		IS		83.2	60- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C2-6:2 FTS		IS		110	40- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C5-PFNA		IS		98.6	50- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C8-PFOSA		IS		61.8	20- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1

Sample ID: OPR					PFAS Isotope Dilution Method				
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: B9K0126-BS1 Column: BEH C18				
Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	102	60- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C8-PFOS	IS	93.6	60- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C2-PFDA	IS	92.2	60- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C2-8:2 FTS	IS	120	40- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
d3-MeFOSAA	IS	64.6	50- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C2-PFUnA	IS	83.7	60- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
d5-EtFOSAA	IS	77.7	50- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C2-PFDoA	IS	91.3	30- 130		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1
13C2-PFTeDA	IS	66.9	20- 150		B9K0126	20-Nov-19	0.250 L	28-Nov-19 02:04	1

Sample ID: Method Blank					PFAS Isotope Dilution Method				
Client Data					Laboratory Data				
Name:	Apex Companies, LLC	Matrix:	Aqueous	Lab Sample:	B9K0188-BLK1	Column:	BEH C18		
Project:	PDX Fire Training Facility								
Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFPeA	2706-90-3	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFBS	375-73-5	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
4:2 FTS	757124-72-4	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFHxA	307-24-4	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFPeS	2706-91-4	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFHpA	375-85-9	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFHxS	355-46-4	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
6:2 FTS	27619-97-2	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFOA	335-67-1	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFHpS	375-92-8	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFNA	375-95-1	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFOSA	754-91-6	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFOS	1763-23-1	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFDA	335-76-2	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
8:2 FTS	39108-34-4	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFNS	68259-12-1	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
MeFOSAA	2355-31-9	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
EtFOSAA	2991-50-6	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFUnA	2058-94-8	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFDS	335-77-3	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFDoA	307-55-1	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFTTrDA	72629-94-8	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
PFTeDA	376-06-7	ND	2.00		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.0	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C3-PFPeA	IS	104	60 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C3-PFBS	IS	102	60 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C2-4:2 FTS	IS	105	20 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C2-PFHxA	IS	100	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C4-PFHpA	IS	98.2	60 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C3-PFHxS	IS	96.9	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C2-6:2 FTS	IS	108	40 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C5-PFNA	IS	99.8	50 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C8-PFOSA	IS	70.4	20 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C2-PFOA	IS	97.8	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C8-PFOS	IS	90.8	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1
13C2-PFDA	IS	91.5	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1

Sample ID: Method Blank					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: B9K0188-BLK1 Column: BEH C18					
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	83.2	40 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1	
d3-MeFOSAA	IS	82.9	50 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1	
13C2-PFUnA	IS	92.9	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1	
d5-EtFOSAA	IS	82.1	50 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1	
13C2-PFDoA	IS	89.0	30 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1	
13C2-PFTeDA	IS	79.4	20 - 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:35	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OPR						PFAS Isotope Dilution Method					
Client Data						Laboratory Data					
Name:	Apex Companies, LLC		Matrix:	Aqueous		Lab Sample:	B9K0188-BS1		Column:	BEH C18	
Project:	PDX Fire Training Facility										
Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	37.1	40.0	92.8	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFPeA	2706-90-3	40.1	40.0	100	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFBS	375-73-5	37.5	40.0	93.7	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
4:2 FTS	757124-72-4	41.1	40.0	103	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFHxA	307-24-4	36.0	40.0	89.9	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFPeS	2706-91-4	40.1	40.0	100	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFHpA	375-85-9	38.6	40.0	96.5	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFHxS	355-46-4	37.2	40.0	93.0	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
6:2 FTS	27619-97-2	31.9	40.0	79.6	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFOA	335-67-1	38.7	40.0	96.7	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFHpS	375-92-8	46.3	40.0	116	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFNA	375-95-1	38.2	40.0	95.6	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFOSA	754-91-6	40.8	40.0	102	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFOS	1763-23-1	43.4	40.1	108	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFDA	335-76-2	40.8	40.0	102	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
8:2 FTS	39108-34-4	35.0	40.0	87.4	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFNS	68259-12-1	32.5	40.0	81.2	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
MeFOSAA	2355-31-9	35.6	40.0	88.9	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
EtFOSAA	2991-50-6	39.4	40.0	98.6	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFUnA	2058-94-8	40.8	40.0	102	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFDS	335-77-3	32.1	40.1	80.2	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFDaA	307-55-1	42.4	40.0	106	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFTTrDA	72629-94-8	43.6	40.0	109	60 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
PFTeDA	376-06-7	39.5	40.0	98.7	70 - 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
Labeled Standards	Type			% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS			98.5	60- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C3-PFPeA	IS			107	60- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C3-PFBS	IS			94.3	60- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C2-4:2 FTS	IS			99.1	20- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C2-PFHxA	IS			104	70- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C4-PFHpA	IS			102	60- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C3-PFHxS	IS			89.4	60- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C2-6:2 FTS	IS			119	40- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C5-PFNA	IS			96.4	50- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C8-PFOSA	IS			65.3	20- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1

Sample ID: OPR					PFAS Isotope Dilution Method				
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: B9K0188-BS1 Column: BEH C18				
Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	96.5	60- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C8-PFOS	IS	89.5	60- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C2-PFDA	IS	92.5	60- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C2-8:2 FTS	IS	114	40- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
d3-MeFOSAA	IS	83.8	50- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C2-PFUnA	IS	83.7	60- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
d5-EtFOSAA	IS	72.6	50- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C2-PFDoA	IS	87.5	30- 130		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1
13C2-PFTeDA	IS	76.0	20- 150		B9K0188	20-Nov-19	0.250 L	28-Nov-19 05:45	1

Sample ID: MW-1
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-01	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 12:30	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	118	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFPeA	2706-90-3	338	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFBS	375-73-5	50.0	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
4:2 FTS	757124-72-4	ND	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFHxA	307-24-4	283	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFPeS	2706-91-4	78.0	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFHpA	375-85-9	182	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFHxS	355-46-4	778	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
6:2 FTS	27619-97-2	261	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFOA	335-67-1	729	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFHpS	375-92-8	42.0	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFNA	375-95-1	88.7	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFOSA	754-91-6	13.3	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFOS	1763-23-1	5340	10.3	D	B9K0188	20-Nov-19	0.244 L	07-Dec-19 02:36	5
PFDA	335-76-2	5.70	2.05	Q	B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
8:2 FTS	39108-34-4	413	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFNS	68259-12-1	2.20	2.05	Q	B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
MeFOSAA	2355-31-9	ND	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
EtFOSAA	2991-50-6	ND	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFUnA	2058-94-8	ND	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFDS	335-77-3	ND	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFDoA	307-55-1	ND	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFTTrDA	72629-94-8	ND	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
PFTeDA	376-06-7	ND	2.05		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.8	60 - 130		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C3-PFPeA	IS	101	60 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C3-PFBS	IS	108	60 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C2-4:2 FTS	IS	107	20 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C2-PFHxA	IS	103	70 - 130		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C4-PFHpA	IS	93.8	60 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C3-PFHxS	IS	98.6	60 - 130		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C2-6:2 FTS	IS	106	40 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C5-PFNA	IS	92.4	50 - 130		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C8-PFOA	IS	66.8	20 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C2-PFOA	IS	98.4	60 - 130		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1
13C8-PFOS	IS	65.5	60 - 130	D	B9K0188	20-Nov-19	0.244 L	07-Dec-19 02:36	5
13C2-PFDA	IS	89.7	60 - 130		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1

Sample ID: MW-1					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-01 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	124	40 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1	
d3-MeFOSAA	IS	73.6	50 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1	
13C2-PFUnA	IS	85.1	60 - 130		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1	
d5-EtFOSAA	IS	70.7	50 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1	
13C2-PFDoA	IS	96.9	30 - 130		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1	
13C2-PFTeDA	IS	68.7	20 - 150		B9K0188	20-Nov-19	0.244 L	28-Nov-19 05:56	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-3

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-02	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 13:05	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	1420	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFPeA	2706-90-3	9400	21.3	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
PFBS	375-73-5	159	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
4:2 FTS	757124-72-4	595	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFHxA	307-24-4	6240	21.3	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
PFPeS	2706-91-4	275	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFHpA	375-85-9	1800	21.3	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
PFHxS	355-46-4	3230	21.3	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
6:2 FTS	27619-97-2	898	106	D	B9K0188	20-Nov-19	0.235 L	13-Dec-19 11:32	50
PFOA	335-67-1	5450	21.3	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
PFHpS	375-92-8	442	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFNA	375-95-1	170	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFOSA	754-91-6	ND	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFOS	1763-23-1	17200	21.3	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
PFDA	335-76-2	57.1	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
8:2 FTS	39108-34-4	1850	21.3	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
PFNS	68259-12-1	5.61	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
MeFOSAA	2355-31-9	ND	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
EtFOSAA	2991-50-6	ND	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFUnA	2058-94-8	4.33	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFDS	335-77-3	ND	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFDoA	307-55-1	ND	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFTTrDA	72629-94-8	ND	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
PFTeDA	376-06-7	ND	2.13		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.6	60 - 130		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
13C3-PFPeA	IS	95.6	60 - 150	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
13C3-PFBS	IS	102	60 - 150		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
13C2-4:2 FTS	IS	98.4	20 - 150		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
13C2-PFHxA	IS	126	70 - 130	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
13C4-PFHpA	IS	101	60 - 150	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
13C3-PFHxS	IS	114	60 - 130	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
13C2-6:2 FTS	IS	85.9	40 - 150	D	B9K0188	20-Nov-19	0.235 L	13-Dec-19 11:32	50
13C5-PFNA	IS	102	50 - 130		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
13C8-PFOSA	IS	54.1	20 - 150		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1
13C2-PFOA	IS	109	60 - 130	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
13C8-PFOS	IS	65.0	60 - 130	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10
13C2-PFDA	IS	85.0	60 - 130		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1

Sample ID: MW-3					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-02 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 08-Nov-19 13:05										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	128	40 - 150	D	B9K0188	20-Nov-19	0.235 L	07-Dec-19 02:46	10	
d3-MeFOSAA	IS	74.0	50 - 150		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1	
13C2-PFUnA	IS	87.5	60 - 130		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1	
d5-EtFOSAA	IS	69.9	50 - 150		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1	
13C2-PFDoA	IS	94.4	30 - 130		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1	
13C2-PFTeDA	IS	74.5	20 - 150		B9K0188	20-Nov-19	0.235 L	28-Nov-19 06:06	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-4
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-03	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 13:45	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	8220	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
PFPeA	2706-90-3	31300	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
PFBS	375-73-5	3600	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
4:2 FTS	757124-72-4	968	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
PFHxA	307-24-4	11600	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
PFPeS	2706-91-4	5440	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
PFHpA	375-85-9	10700	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
PFHxS	355-46-4	28900	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
6:2 FTS	27619-97-2	1400	105	D	B9K0188	20-Nov-19	0.239 L	13-Dec-19 11:43	50
PFOA	335-67-1	9940	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
PFHpS	375-92-8	3770	31.4	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
PFNA	375-95-1	369	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
PFOSA	754-91-6	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
PFOS	1763-23-1	36200	62.9	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:07	30
PFDA	335-76-2	10.8	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
8:2 FTS	39108-34-4	7610	62.9	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:07	30
PFNS	68259-12-1	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
MeFOSAA	2355-31-9	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
EtFOSAA	2991-50-6	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
PFUnA	2058-94-8	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
PFDS	335-77-3	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
PFDoA	307-55-1	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
PFTTrDA	72629-94-8	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
PFTeDA	376-06-7	ND	2.10		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.4	60 - 130	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
13C3-PFPeA	IS	97.7	60 - 150	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
13C3-PFBS	IS	136	60 - 150	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
13C2-4:2 FTS	IS	131	20 - 150		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
13C2-PFHxA	IS	223	70 - 130	D, H	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
13C4-PFHpA	IS	102	60 - 150	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
13C3-PFHxS	IS	96.7	60 - 130	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
13C2-6:2 FTS	IS	82.7	40 - 150	D	B9K0188	20-Nov-19	0.239 L	13-Dec-19 11:43	50
13C5-PFNA	IS	98.0	50 - 130		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
13C8-PFOSA	IS	44.5	20 - 150		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1
13C2-PFOA	IS	120	60 - 130	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:18	15
13C8-PFOS	IS	37.2	60 - 130	D, H	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:07	30
13C2-PFDA	IS	91.2	60 - 130		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1

Sample ID: MW-4					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-03 Date Received: 12-Nov-19 10:00 Matrix: Groundwater Date Collected: 08-Nov-19 13:45 Column: BEH C18					
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	68.8	40 - 150	D	B9K0188	20-Nov-19	0.239 L	07-Dec-19 03:07	30	
d3-MeFOSAA	IS	87.7	50 - 150		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1	
13C2-PFUnA	IS	83.8	60 - 130		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1	
d5-EtFOSAA	IS	80.9	50 - 150		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1	
13C2-PFDoA	IS	89.3	30 - 130		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1	
13C2-PFTeDA	IS	65.4	20 - 150		B9K0188	20-Nov-19	0.239 L	28-Nov-19 06:17	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-8

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-04	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 10:28	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	206	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFPeA	2706-90-3	453	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFBS	375-73-5	60.4	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
4:2 FTS	757124-72-4	3.15	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFHxA	307-24-4	373	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFPeS	2706-91-4	43.1	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFHpA	375-85-9	163	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFHxS	355-46-4	457	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
6:2 FTS	27619-97-2	44.9	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFOA	335-67-1	465	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFHpS	375-92-8	6.01	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFNA	375-95-1	25.9	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFOSA	754-91-6	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFOS	1763-23-1	237	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFDA	335-76-2	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
8:2 FTS	39108-34-4	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFNS	68259-12-1	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
MeFOSAA	2355-31-9	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
EtFOSAA	2991-50-6	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFUnA	2058-94-8	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFDS	335-77-3	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFDoA	307-55-1	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFTTrDA	72629-94-8	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
PFTeDA	376-06-7	ND	2.03		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	84.3	60 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C3-PFPeA	IS	91.0	60 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C3-PFBS	IS	108	60 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C2-4:2 FTS	IS	97.6	20 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C2-PFHxA	IS	94.2	70 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C4-PFHpA	IS	96.5	60 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C3-PFHxS	IS	92.8	60 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C2-6:2 FTS	IS	91.1	40 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C5-PFNA	IS	97.7	50 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C8-PFOSA	IS	29.8	20 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C2-PFOA	IS	88.5	60 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C8-PFOS	IS	97.0	60 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1
13C2-PFDA	IS	85.8	60 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1

Sample ID: MW-8					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-04 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 08-Nov-19 10:28										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	78.8	40 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1	
d3-MeFOSAA	IS	76.3	50 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1	
13C2-PFUnA	IS	74.9	60 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1	
d5-EtFOSAA	IS	84.5	50 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1	
13C2-PFDoA	IS	68.0	30 - 130		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1	
13C2-PFTeDA	IS	28.1	20 - 150		B9K0188	20-Nov-19	0.246 L	07-Dec-19 03:39	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-10A
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-05	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 11:50	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	122	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFPeA	2706-90-3	337	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFBS	375-73-5	190	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
4:2 FTS	757124-72-4	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFHxA	307-24-4	766	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFPeS	2706-91-4	87.7	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFHpA	375-85-9	154	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFHxS	355-46-4	1090	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
6:2 FTS	27619-97-2	32.9	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFOA	335-67-1	4810	10.2	D	B9K0188	20-Nov-19	0.245 L	09-Dec-19 09:41	5
PFHpS	375-92-8	8.46	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFNA	375-95-1	14.3	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFOSA	754-91-6	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFOS	1763-23-1	503	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFDA	335-76-2	14.9	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
8:2 FTS	39108-34-4	3.84	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFNS	68259-12-1	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
MeFOSAA	2355-31-9	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
EtFOSAA	2991-50-6	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFUnA	2058-94-8	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFDS	335-77-3	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFDoA	307-55-1	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFTTrDA	72629-94-8	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
PFTeDA	376-06-7	ND	2.04		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.7	60 - 130		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C3-PFPeA	IS	107	60 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C3-PFBS	IS	105	60 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C2-4:2 FTS	IS	96.5	20 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C2-PFHxA	IS	103	70 - 130		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C4-PFHpA	IS	99.6	60 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C3-PFHxS	IS	95.6	60 - 130		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C2-6:2 FTS	IS	95.8	40 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C5-PFNA	IS	88.4	50 - 130		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C8-PFOSA	IS	76.5	20 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C2-PFOA	IS	98.2	60 - 130	D	B9K0188	20-Nov-19	0.245 L	09-Dec-19 09:41	5
13C8-PFOS	IS	80.7	60 - 130		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1
13C2-PFDA	IS	86.9	60 - 130		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1

Sample ID: MW-10A					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-05 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 08-Nov-19 11:50										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	89.1	40 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1	
d3-MeFOSAA	IS	82.1	50 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1	
13C2-PFUnA	IS	96.3	60 - 130		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1	
d5-EtFOSAA	IS	76.6	50 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1	
13C2-PFDoA	IS	94.4	30 - 130		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1	
13C2-PFTeDA	IS	77.7	20 - 150		B9K0188	20-Nov-19	0.245 L	28-Nov-19 06:38	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-14
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-06	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 11:10	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	65.9	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFPeA	2706-90-3	116	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFBS	375-73-5	19.3	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
4:2 FTS	757124-72-4	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFHxA	307-24-4	72.8	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFPeS	2706-91-4	33.0	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFHpA	375-85-9	55.7	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFHxS	355-46-4	346	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
6:2 FTS	27619-97-2	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFOA	335-67-1	87.3	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFHpS	375-92-8	3.11	2.01	Q	B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFNA	375-95-1	34.7	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFOSA	754-91-6	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFOS	1763-23-1	553	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFDA	335-76-2	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
8:2 FTS	39108-34-4	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFNS	68259-12-1	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
MeFOSAA	2355-31-9	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
EtFOSAA	2991-50-6	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFA	2058-94-8	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFDS	335-77-3	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFDoA	307-55-1	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFTTrDA	72629-94-8	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
PFTeDA	376-06-7	ND	2.01		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.9	60 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C3-PFPeA	IS	102	60 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C3-PFBS	IS	98.9	60 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C2-4:2 FTS	IS	99.9	20 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C2-PFHxA	IS	97.5	70 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C4-PFHpA	IS	93.0	60 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C3-PFHxS	IS	90.5	60 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C2-6:2 FTS	IS	93.6	40 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C5-PFNA	IS	95.7	50 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C8-PFOSA	IS	66.1	20 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C2-PFOA	IS	97.5	60 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C8-PFOS	IS	99.8	60 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1
13C2-PFDA	IS	98.4	60 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1

Sample ID: MW-14					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-06 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 08-Nov-19 11:10										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	101	40 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1	
d3-MeFOSAA	IS	84.5	50 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1	
13C2-PFUnA	IS	88.6	60 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1	
d5-EtFOSAA	IS	65.2	50 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1	
13C2-PFDoA	IS	101	30 - 130		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1	
13C2-PFTeDA	IS	70.5	20 - 150		B9K0126	20-Nov-19	0.249 L	28-Nov-19 02:14	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-15					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-07 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBA	375-22-4	41.1	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFPeA	2706-90-3	125	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFBS	375-73-5	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
4:2 FTS	757124-72-4	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFHxA	307-24-4	86.4	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFPeS	2706-91-4	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFHpA	375-85-9	43.9	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFHxS	355-46-4	13.5	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
6:2 FTS	27619-97-2	105	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFOA	335-67-1	64.4	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFHpS	375-92-8	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFNA	375-95-1	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFOSA	754-91-6	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFOS	1763-23-1	4.66	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFDA	335-76-2	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
8:2 FTS	39108-34-4	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFNS	68259-12-1	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
MeFOSAA	2355-31-9	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
EtFOSAA	2991-50-6	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFUnA	2058-94-8	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFDS	335-77-3	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFDoA	307-55-1	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFTTrDA	72629-94-8	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
PFTeDA	376-06-7	ND	2.07		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBA	IS	92.9	60 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C3-PFPeA	IS	105	60 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C3-PFBS	IS	89.6	60 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C2-4:2 FTS	IS	89.5	20 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C2-PFHxA	IS	99.5	70 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C4-PFHpA	IS	98.2	60 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C3-PFHxS	IS	87.0	60 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C2-6:2 FTS	IS	97.6	40 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C5-PFNA	IS	103	50 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C8-PFOSA	IS	78.2	20 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C2-PFOA	IS	101	60 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C8-PFOS	IS	93.5	60 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C2-PFDA	IS	101	60 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	

Sample ID: MW-15					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-07 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 08-Nov-19 09:45										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	100	40 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
d3-MeFOSAA	IS	83.1	50 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C2-PFUnA	IS	99.8	60 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
d5-EtFOSAA	IS	83.2	50 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C2-PFDoA	IS	112	30 - 130		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	
13C2-PFTeDA	IS	78.8	20 - 150		B9K0126	20-Nov-19	0.241 L	28-Nov-19 02:46	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-16

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-08	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 10:30	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	9.13	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFPeA	2706-90-3	27.0	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFBS	375-73-5	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
4:2 FTS	757124-72-4	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFHxA	307-24-4	18.4	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFPeS	2706-91-4	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFHpA	375-85-9	19.3	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFHxS	355-46-4	2.60	2.03	Q	B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
6:2 FTS	27619-97-2	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFOA	335-67-1	19.7	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFHpS	375-92-8	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFNA	375-95-1	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFOSA	754-91-6	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFOS	1763-23-1	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFDA	335-76-2	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
8:2 FTS	39108-34-4	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFNS	68259-12-1	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
MeFOSAA	2355-31-9	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
EtFOSAA	2991-50-6	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFUnA	2058-94-8	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFDS	335-77-3	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFDoA	307-55-1	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFTTrDA	72629-94-8	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
PFTeDA	376-06-7	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.1	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C3-PFPeA	IS	100	60 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C3-PFBS	IS	87.2	60 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C2-4:2 FTS	IS	90.0	20 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C2-PFHxA	IS	102	70 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C4-PFHpA	IS	94.1	60 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C3-PFHxS	IS	103	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C2-6:2 FTS	IS	98.4	40 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C5-PFNA	IS	101	50 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C8-PFOSA	IS	76.5	20 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C2-PFOA	IS	93.2	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C8-PFOS	IS	98.0	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1
13C2-PFDA	IS	96.0	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1

Sample ID: MW-16					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-08 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 10:30										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	86.8	40 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1	
d3-MeFOSAA	IS	77.6	50 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1	
13C2-PFUnA	IS	96.8	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1	
d5-EtFOSAA	IS	75.5	50 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1	
13C2-PFDoA	IS	95.8	30 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1	
13C2-PFTeDA	IS	68.5	20 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 02:57	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-17

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-09	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 11:10	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFPeA	2706-90-3	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFBS	375-73-5	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
4:2 FTS	757124-72-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFHxA	307-24-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFPeS	2706-91-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFHpA	375-85-9	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFHxS	355-46-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
6:2 FTS	27619-97-2	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFOA	335-67-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFHpS	375-92-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFNA	375-95-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFOSA	754-91-6	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFOS	1763-23-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFDA	335-76-2	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
8:2 FTS	39108-34-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFNS	68259-12-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
MeFOSAA	2355-31-9	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
EtFOSAA	2991-50-6	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFUnA	2058-94-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFDS	335-77-3	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFDoA	307-55-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFTTrDA	72629-94-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
PFTeDA	376-06-7	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.5	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C3-PFPeA	IS	104	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C3-PFBS	IS	88.0	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C2-4:2 FTS	IS	95.0	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C2-PFHxA	IS	102	70 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C4-PFHpA	IS	97.6	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C3-PFHxS	IS	90.6	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C2-6:2 FTS	IS	106	40 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C5-PFNA	IS	106	50 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C8-PFOSA	IS	78.3	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C2-PFOA	IS	103	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C8-PFOS	IS	94.8	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1
13C2-PFDA	IS	99.0	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1

Sample ID: MW-17					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-09 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 11:10										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	113	40 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1	
d3-MeFOSAA	IS	80.1	50 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1	
13C2-PFUnA	IS	95.3	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1	
d5-EtFOSAA	IS	75.3	50 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1	
13C2-PFDoA	IS	96.0	30 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1	
13C2-PFTeDA	IS	69.4	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 03:07	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-18
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-10	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 13:35	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFPeA	2706-90-3	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFBS	375-73-5	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
4:2 FTS	757124-72-4	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFHxA	307-24-4	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFPeS	2706-91-4	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFHpA	375-85-9	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFHxS	355-46-4	3.26	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
6:2 FTS	27619-97-2	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFOA	335-67-1	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFHpS	375-92-8	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFNA	375-95-1	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFOSA	754-91-6	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFOS	1763-23-1	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFDA	335-76-2	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
8:2 FTS	39108-34-4	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFNS	68259-12-1	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
MeFOSAA	2355-31-9	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
EtFOSAA	2991-50-6	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFUnA	2058-94-8	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFDS	335-77-3	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFDoA	307-55-1	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFTTrDA	72629-94-8	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
PFTeDA	376-06-7	ND	2.03		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	98.0	60 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C3-PFPeA	IS	105	60 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C3-PFBS	IS	105	60 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C2-4:2 FTS	IS	114	20 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C2-PFHxA	IS	97.9	70 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C4-PFHpA	IS	96.2	60 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C3-PFHxS	IS	111	60 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C2-6:2 FTS	IS	106	40 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C5-PFNA	IS	93.5	50 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C8-PFOSA	IS	75.8	20 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C2-PFOA	IS	103	60 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C8-PFOS	IS	96.5	60 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1
13C2-PFDA	IS	95.7	60 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1

Sample ID: MW-18					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-10 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 13:35										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	105	40 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1	
d3-MeFOSAA	IS	73.1	50 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1	
13C2-PFUnA	IS	91.0	60 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1	
d5-EtFOSAA	IS	76.8	50 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1	
13C2-PFDoA	IS	105	30 - 130		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1	
13C2-PFTeDA	IS	68.6	20 - 150		B9K0126	20-Nov-19	0.246 L	28-Nov-19 03:18	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-19
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-11	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 14:05	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	4.26	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFPeA	2706-90-3	2.96	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFBS	375-73-5	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
4:2 FTS	757124-72-4	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFHxA	307-24-4	3.64	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFPeS	2706-91-4	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFHpA	375-85-9	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFHxS	355-46-4	11.3	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
6:2 FTS	27619-97-2	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFOA	335-67-1	6.03	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFHpS	375-92-8	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFNA	375-95-1	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFOSA	754-91-6	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFOS	1763-23-1	42.0	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFDA	335-76-2	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
8:2 FTS	39108-34-4	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFNS	68259-12-1	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
MeFOSAA	2355-31-9	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
EtFOSAA	2991-50-6	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFUnA	2058-94-8	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFDS	335-77-3	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFDoA	307-55-1	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFTTrDA	72629-94-8	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
PFTeDA	376-06-7	ND	2.13		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.7	60 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C3-PFPeA	IS	105	60 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C3-PFBS	IS	80.5	60 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C2-4:2 FTS	IS	80.2	20 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C2-PFHxA	IS	105	70 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C4-PFHpA	IS	98.2	60 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C3-PFHxS	IS	83.4	60 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C2-6:2 FTS	IS	96.5	40 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C5-PFNA	IS	104	50 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C8-PFOSA	IS	82.7	20 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C2-PFOA	IS	97.3	60 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C8-PFOS	IS	83.1	60 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1
13C2-PFDA	IS	92.9	60 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1

Sample ID: MW-19					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-11 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 14:05										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	94.8	40 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1	
d3-MeFOSAA	IS	86.9	50 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1	
13C2-PFUnA	IS	91.9	60 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1	
d5-EtFOSAA	IS	77.3	50 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1	
13C2-PFDoA	IS	98.2	30 - 130		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1	
13C2-PFTeDA	IS	44.0	20 - 150		B9K0126	20-Nov-19	0.235 L	28-Nov-19 03:28	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-20
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-12	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 14:45	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	2.64	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFPeA	2706-90-3	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFBS	375-73-5	4.21	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
4:2 FTS	757124-72-4	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFHxA	307-24-4	2.13	2.03	Q	B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFPeS	2706-91-4	2.46	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFHpA	375-85-9	2.28	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFHxS	355-46-4	15.9	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
6:2 FTS	27619-97-2	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFOA	335-67-1	6.11	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFHpS	375-92-8	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFNA	375-95-1	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFOSA	754-91-6	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFOS	1763-23-1	33.9	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFDA	335-76-2	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
8:2 FTS	39108-34-4	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFNS	68259-12-1	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
MeFOSAA	2355-31-9	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
EtFOSAA	2991-50-6	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFUnA	2058-94-8	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFDS	335-77-3	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFDoA	307-55-1	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFTTrDA	72629-94-8	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
PFTeDA	376-06-7	ND	2.03		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.4	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C3-PFPeA	IS	96.9	60 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C3-PFBS	IS	104	60 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C2-4:2 FTS	IS	99.6	20 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C2-PFHxA	IS	99.9	70 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C4-PFHpA	IS	91.8	60 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C3-PFHxS	IS	107	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C2-6:2 FTS	IS	87.5	40 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C5-PFNA	IS	96.7	50 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C8-PFOSA	IS	79.8	20 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C2-PFOA	IS	102	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C8-PFOS	IS	99.6	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1
13C2-PFDA	IS	89.8	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1

Sample ID: MW-20					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-12 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 14:45										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	105	40 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1	
d3-MeFOSAA	IS	75.6	50 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1	
13C2-PFUnA	IS	89.7	60 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1	
d5-EtFOSAA	IS	82.6	50 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1	
13C2-PFDoA	IS	95.1	30 - 130		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1	
13C2-PFTeDA	IS	76.5	20 - 150		B9K0126	20-Nov-19	0.247 L	28-Nov-19 03:39	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-21
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-13	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 15:20	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFPeA	2706-90-3	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFBS	375-73-5	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
4:2 FTS	757124-72-4	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFHxA	307-24-4	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFPeS	2706-91-4	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFHpA	375-85-9	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFHxS	355-46-4	5.14	2.12	Q	B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
6:2 FTS	27619-97-2	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFOA	335-67-1	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFHpS	375-92-8	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFNA	375-95-1	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFOSA	754-91-6	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFOS	1763-23-1	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFDA	335-76-2	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
8:2 FTS	39108-34-4	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFNS	68259-12-1	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
MeFOSAA	2355-31-9	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
EtFOSAA	2991-50-6	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFUnA	2058-94-8	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFDS	335-77-3	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFDoA	307-55-1	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFTTrDA	72629-94-8	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
PFTeDA	376-06-7	ND	2.12		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	85.0	60 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C3-PFPeA	IS	99.0	60 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C3-PFBS	IS	96.1	60 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C2-4:2 FTS	IS	102	20 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C2-PFHxA	IS	97.0	70 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C4-PFHpA	IS	99.7	60 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C3-PFHxS	IS	99.9	60 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C2-6:2 FTS	IS	107	40 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C5-PFNA	IS	94.9	50 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C8-PFOSA	IS	86.3	20 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C2-PFOA	IS	97.6	60 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C8-PFOS	IS	96.4	60 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1
13C2-PFDA	IS	84.5	60 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1

Sample ID: MW-21					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-13 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	118	40 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1	
d3-MeFOSAA	IS	87.1	50 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1	
13C2-PFUnA	IS	93.6	60 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1	
d5-EtFOSAA	IS	79.9	50 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1	
13C2-PFDoA	IS	95.7	30 - 130		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1	
13C2-PFTeDA	IS	81.5	20 - 150		B9K0126	20-Nov-19	0.236 L	28-Nov-19 03:49	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-22					PFAS Isotope Dilution Method				
Client Data				Laboratory Data					
Name:	Apex Companies, LLC		Matrix:	Groundwater	Lab Sample:	1903989-14		Column:	BEH C18
Project:	PDX Fire Training Facility		Date Collected:	07-Nov-19 12:35	Date Received:	12-Nov-19 10:00			
Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFPeA	2706-90-3	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFBS	375-73-5	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
4:2 FTS	757124-72-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFHxA	307-24-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFPeS	2706-91-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFHpA	375-85-9	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFHxS	355-46-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
6:2 FTS	27619-97-2	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFOA	335-67-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFHpS	375-92-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFNA	375-95-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFOSA	754-91-6	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFOS	1763-23-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFDA	335-76-2	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
8:2 FTS	39108-34-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFNS	68259-12-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
MeFOSAA	2355-31-9	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
EtFOSAA	2991-50-6	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFUnA	2058-94-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFDS	335-77-3	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFDoA	307-55-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFTTrDA	72629-94-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
PFTeDA	376-06-7	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.0	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C3-PFPeA	IS	101	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C3-PFBS	IS	97.7	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C2-4:2 FTS	IS	104	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C2-PFHxA	IS	98.0	70 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C4-PFHpA	IS	95.1	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C3-PFHxS	IS	93.8	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C2-6:2 FTS	IS	105	40 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C5-PFNA	IS	99.1	50 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C8-PFOSA	IS	78.8	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C2-PFOA	IS	94.0	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C8-PFOS	IS	109	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1
13C2-PFDA	IS	95.6	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1

Sample ID: MW-22					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-14 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 12:35										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	115	40 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1	
d3-MeFOSAA	IS	84.8	50 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1	
13C2-PFUnA	IS	97.6	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1	
d5-EtFOSAA	IS	82.2	50 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1	
13C2-PFDoA	IS	103	30 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1	
13C2-PFTeDA	IS	77.8	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 04:00	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-23
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-15	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 11:55	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFPeA	2706-90-3	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFBS	375-73-5	5.17	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
4:2 FTS	757124-72-4	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFHxA	307-24-4	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFPeS	2706-91-4	5.47	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFHpA	375-85-9	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFHxS	355-46-4	24.5	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
6:2 FTS	27619-97-2	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFOA	335-67-1	2.35	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFHpS	375-92-8	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFNA	375-95-1	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFOSA	754-91-6	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFOS	1763-23-1	6.98	2.02	Q	B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFDA	335-76-2	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
8:2 FTS	39108-34-4	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFNS	68259-12-1	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
MeFOSAA	2355-31-9	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
EtFOSAA	2991-50-6	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFUnA	2058-94-8	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFDS	335-77-3	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFDoA	307-55-1	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFTTrDA	72629-94-8	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
PFTeDA	376-06-7	ND	2.02		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.2	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C3-PFPeA	IS	101	60 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C3-PFBS	IS	108	60 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C2-4:2 FTS	IS	114	20 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C2-PFHxA	IS	102	70 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C4-PFHpA	IS	101	60 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C3-PFHxS	IS	105	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C2-6:2 FTS	IS	94.2	40 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C5-PFNA	IS	95.8	50 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C8-PFOSA	IS	40.6	20 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C2-PFOA	IS	97.5	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C8-PFOS	IS	83.0	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1
13C2-PFDA	IS	92.3	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1

Sample ID: MW-23					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-15 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 11:55										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	83.0	40 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1	
d3-MeFOSAA	IS	78.8	50 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1	
13C2-PFUnA	IS	83.6	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1	
d5-EtFOSAA	IS	72.0	50 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1	
13C2-PFDoA	IS	83.3	30 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1	
13C2-PFTeDA	IS	73.1	20 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:11	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-24
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-16	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 16:00	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFPeA	2706-90-3	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFBS	375-73-5	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
4:2 FTS	757124-72-4	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFHxA	307-24-4	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFPeS	2706-91-4	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFHpA	375-85-9	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFHxS	355-46-4	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
6:2 FTS	27619-97-2	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFOA	335-67-1	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFHpS	375-92-8	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFNA	375-95-1	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFOSA	754-91-6	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFOS	1763-23-1	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFDA	335-76-2	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
8:2 FTS	39108-34-4	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFNS	68259-12-1	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
MeFOSAA	2355-31-9	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
EtFOSAA	2991-50-6	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFUnA	2058-94-8	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFDS	335-77-3	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFDoA	307-55-1	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFTTrDA	72629-94-8	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
PFTeDA	376-06-7	ND	2.14		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.0	60 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C3-PFPeA	IS	105	60 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C3-PFBS	IS	86.9	60 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C2-4:2 FTS	IS	88.3	20 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C2-PFHxA	IS	99.2	70 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C4-PFHpA	IS	97.1	60 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C3-PFHxS	IS	86.4	60 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C2-6:2 FTS	IS	98.5	40 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C5-PFNA	IS	94.6	50 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C8-PFOSA	IS	78.3	20 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C2-PFOA	IS	97.2	60 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C8-PFOS	IS	102	60 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1
13C2-PFDA	IS	93.4	60 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1

Sample ID: MW-24					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-16 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 16:00										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	118	40 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1	
d3-MeFOSAA	IS	83.6	50 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1	
13C2-PFUnA	IS	93.5	60 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1	
d5-EtFOSAA	IS	79.5	50 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1	
13C2-PFDoA	IS	98.9	30 - 130		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1	
13C2-PFTeDA	IS	75.3	20 - 150		B9K0126	20-Nov-19	0.234 L	28-Nov-19 04:21	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-25

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-17	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 09:35	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFPeA	2706-90-3	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFBS	375-73-5	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
4:2 FTS	757124-72-4	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFHxA	307-24-4	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFPeS	2706-91-4	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFHpA	375-85-9	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFHxS	355-46-4	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
6:2 FTS	27619-97-2	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFOA	335-67-1	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFHpS	375-92-8	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFNA	375-95-1	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFOSA	754-91-6	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFOS	1763-23-1	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFDA	335-76-2	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
8:2 FTS	39108-34-4	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFNS	68259-12-1	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
MeFOSAA	2355-31-9	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
EtFOSAA	2991-50-6	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFA	2058-94-8	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFDS	335-77-3	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFDoA	307-55-1	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFTTrDA	72629-94-8	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
PFTeDA	376-06-7	ND	2.01		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.8	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C3-PFPeA	IS	95.8	60 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C3-PFBS	IS	90.3	60 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C2-4:2 FTS	IS	92.8	20 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C2-PFHxA	IS	92.9	70 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C4-PFHpA	IS	90.8	60 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C3-PFHxS	IS	89.3	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C2-6:2 FTS	IS	86.8	40 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C5-PFNA	IS	97.3	50 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C8-PFOA	IS	80.3	20 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C2-PFOA	IS	98.7	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C8-PFOS	IS	91.4	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1
13C2-PFDA	IS	92.3	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1

Sample ID: MW-25					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-17 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 09:35										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	101	40 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1	
d3-MeFOSAA	IS	90.4	50 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1	
13C2-PFUnA	IS	98.8	60 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1	
d5-EtFOSAA	IS	87.5	50 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1	
13C2-PFDoA	IS	88.9	30 - 130		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1	
13C2-PFTeDA	IS	80.1	20 - 150		B9K0126	20-Nov-19	0.248 L	28-Nov-19 04:53	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-26					PFAS Isotope Dilution Method				
Client Data				Laboratory Data					
Name:	Apex Companies, LLC		Matrix:	Groundwater	Lab Sample:	1903989-18		Column:	BEH C18
Project:	PDX Fire Training Facility		Date Collected:	06-Nov-19 10:10	Date Received:	12-Nov-19 10:00			
Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	67.3	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFPeA	2706-90-3	205	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFBS	375-73-5	23.7	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
4:2 FTS	757124-72-4	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFHxA	307-24-4	173	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFPeS	2706-91-4	16.7	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFHpA	375-85-9	110	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFHxS	355-46-4	93.8	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
6:2 FTS	27619-97-2	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFOA	335-67-1	323	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFHpS	375-92-8	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFNA	375-95-1	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFOSA	754-91-6	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFOS	1763-23-1	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFDA	335-76-2	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
8:2 FTS	39108-34-4	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFNS	68259-12-1	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
MeFOSAA	2355-31-9	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
EtFOSAA	2991-50-6	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFUnA	2058-94-8	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFDS	335-77-3	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFDoA	307-55-1	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFTTrDA	72629-94-8	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
PFTeDA	376-06-7	ND	2.04		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.5	60 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C3-PFPeA	IS	108	60 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C3-PFBS	IS	95.8	60 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C2-4:2 FTS	IS	91.8	20 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C2-PFHxA	IS	103	70 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C4-PFHpA	IS	98.1	60 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C3-PFHxS	IS	95.2	60 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C2-6:2 FTS	IS	99.7	40 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C5-PFNA	IS	100	50 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C8-PFOSA	IS	67.2	20 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C2-PFOA	IS	97.3	60 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C8-PFOS	IS	89.2	60 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1
13C2-PFDA	IS	91.8	60 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1

Sample ID: MW-26					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-18 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 10:10										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	94.7	40 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1	
d3-MeFOSAA	IS	67.5	50 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1	
13C2-PFUnA	IS	87.4	60 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1	
d5-EtFOSAA	IS	71.6	50 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1	
13C2-PFDoA	IS	94.6	30 - 130		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1	
13C2-PFTeDA	IS	70.8	20 - 150		B9K0126	20-Nov-19	0.245 L	28-Nov-19 05:03	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-27
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-19	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 09:40	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFPeA	2706-90-3	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFBS	375-73-5	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
4:2 FTS	757124-72-4	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFHxA	307-24-4	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFPeS	2706-91-4	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFHpA	375-85-9	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFHxS	355-46-4	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
6:2 FTS	27619-97-2	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFOA	335-67-1	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFHpS	375-92-8	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFNA	375-95-1	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFOSA	754-91-6	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFOS	1763-23-1	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFDA	335-76-2	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
8:2 FTS	39108-34-4	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFNS	68259-12-1	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
MeFOSAA	2355-31-9	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
EtFOSAA	2991-50-6	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFUnA	2058-94-8	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFDS	335-77-3	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFDoA	307-55-1	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFTTrDA	72629-94-8	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
PFTeDA	376-06-7	ND	2.06		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	89.6	60 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C3-PFPeA	IS	99.7	60 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C3-PFBS	IS	90.9	60 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C2-4:2 FTS	IS	91.9	20 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C2-PFHxA	IS	98.7	70 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C4-PFHpA	IS	97.8	60 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C3-PFHxS	IS	83.3	60 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C2-6:2 FTS	IS	94.8	40 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C5-PFNA	IS	91.4	50 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C8-PFOSA	IS	66.5	20 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C2-PFOA	IS	97.4	60 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C8-PFOS	IS	94.7	60 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1
13C2-PFDA	IS	97.4	60 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1

Sample ID: MW-27					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-19 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 09:40										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	97.7	40 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1	
d3-MeFOSAA	IS	77.5	50 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1	
13C2-PFUnA	IS	88.2	60 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1	
d5-EtFOSAA	IS	83.4	50 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1	
13C2-PFDoA	IS	110	30 - 130		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1	
13C2-PFTeDA	IS	72.1	20 - 150		B9K0126	20-Nov-19	0.242 L	28-Nov-19 05:14	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-28
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903989-20	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 11:05	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	93.0	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFPeA	2706-90-3	400	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFBS	375-73-5	26.3	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
4:2 FTS	757124-72-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFHxA	307-24-4	617	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFPeS	2706-91-4	20.6	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFHpA	375-85-9	464	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFHxS	355-46-4	330	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
6:2 FTS	27619-97-2	15.5	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFOA	335-67-1	17400	30.7	D	B9K0126	20-Nov-19	0.244 L	05-Dec-19 01:12	15
PFHpS	375-92-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFNA	375-95-1	9.77	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFOSA	754-91-6	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFOS	1763-23-1	8.84	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFDA	335-76-2	2.06	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
8:2 FTS	39108-34-4	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFNS	68259-12-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
MeFOSAA	2355-31-9	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
EtFOSAA	2991-50-6	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFUnA	2058-94-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFDS	335-77-3	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFDoA	307-55-1	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFTTrDA	72629-94-8	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
PFTeDA	376-06-7	ND	2.05		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	44.2	60 - 130	H	B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C3-PFPeA	IS	83.7	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C3-PFBS	IS	87.9	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C2-4:2 FTS	IS	61.5	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C2-PFHxA	IS	90.7	70 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C4-PFHpA	IS	96.2	60 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C3-PFHxS	IS	91.5	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C2-6:2 FTS	IS	76.2	40 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C5-PFNA	IS	86.1	50 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C8-PFOSA	IS	53.3	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C2-PFOA	IS	140	60 - 130	D, H	B9K0126	20-Nov-19	0.244 L	05-Dec-19 01:12	15
13C8-PFOS	IS	83.7	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1
13C2-PFDA	IS	78.5	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1

Sample ID: MW-28					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903989-20 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 11:05										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	91.8	40 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1	
d3-MeFOSAA	IS	71.2	50 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1	
13C2-PFUnA	IS	83.0	60 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1	
d5-EtFOSAA	IS	71.9	50 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1	
13C2-PFDoA	IS	81.4	30 - 130		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1	
13C2-PFTeDA	IS	64.5	20 - 150		B9K0126	20-Nov-19	0.244 L	28-Nov-19 05:24	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



CHAIN OF CUSTODY

For Laboratory Use Only

Work Order #:

1903989

Temp: 1.9, 1.7 °C

Storage ID:

R-13, WR-2

Storage Secured: Yes ☒ No ☐

Project ID: **PDX Fire Training Facility**

PO#: **1264-06**

Sampler: **Kyle Kline**

(name)

TAT

Standard: ☒ 21 days

(check one):

Rush (surcharge may apply)

☐ 14 days

☐ 7 days

Specify:

Invoice to: Name

Company

Address

City

State

Ph#

Fax#

Heather Gosack

Apex Companies

3015 SW 1st Ave

Portland

OR

503-924-4704

Relinquished by (printed name and signature)

Date

Time

Received by (printed name and signature)

Date

Time

Kyle Kline

Kyle Kline

11/11/19

1130

Hayden Grana *Hayden Grana*

11/12/19

10:00

Relinquished by (printed name and signature)

Date

Time

Received by (printed name and signature)

Date

Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: _____

Method of Shipment:

Tracking No.: _____

Add Analysis(es) Requested

Container(s)

Mod. EPA
Method 537

EPA Method
537(DW only)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	ADONA, Gen-X, F33-8	TOP Assay	537 List: 24	Full List of 28	Other: Please List Below	PFOA/PFOs	UCMR3 PFAS List 8	PFAS List: 14	Comments
MW-1	11/8/19	1230		2	P	GW			X						Potential high concentrations
MW-3	11/8/19	1305		2	P	GW			X						Potential high concentrations
MW-4	11/8/19	1345		2	P	GW			X						High PFC concentrations
MW-8	11/8/19	1028		2	P	GW			X						Potential high concentrations
MW-10A	11/8/19	1150		2	P	GW			X						Potential high concentrations
MW-14	11/8/19	1110		2	P	GW			X						Potential high concentrations
MW-15	11/8/19	945		2	P	GW			X						
MW-16	11/7/19	1030		2	P	GW			X						
MW-17	11/7/19	1110		2	P	GW			X						
MW-18	11/7/19	1335		2	P	GW			X						

Special Instructions/Comments:

SEND
DOCUMENTATION
AND RESULTS TO:

Name: **Heather Gosack and Kelsi Evans**

Company: **see above**

Address:

City:

State:

Zip:

Phone:

Fax:

Email: **Heather.Gosack@apexcos.com; kelsi.evans@apexcos.com**

Container Types: P= HDPE, PJ= HDPE Jar

O = Other:

Bottle Preservation Type: T = Thiosulfate,

TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,

SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:



CHAIN OF CUSTODY

For Laboratory Use Only

Work Order #:

1903989

Temp:

19.17 °C

Storage ID:

R-13, WR-2

Storage Secured: Yes ☒ No ☐

Project ID: **PDX Fire Training Facility**

PO#: **1264-06**

Sampler: **Kyle Kline**

(name)

TAT

Standard: ☒ 21 days

(check one):

Rush (surcharge may apply)

☐ 14 days

☐ 7 days Specify:

Invoice to: Name

Company

Address

City

State

Ph#

Fax#

Heather Gosack

Apex Companies

3015 SW 1st Ave

Portland

OR

503-924-4704

Relinquished by (printed name and signature)

Date

Time

Received by (printed name and signature)

Date

Time

Kyle Kline

[Signature]

11/11/19

1130

Hayden Grana *[Signature]*

11/12/19

10:00

Relinquished by (printed name and signature)

Date

Time

Received by (printed name and signature)

Date

Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: _____

Method of Shipment:

Tracking No.: _____

Add Analysis(es) Requested

Container(s)

Mod. EPA
Method 537

EPA Method
537(DW
only)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	ADONA Gen-X F53-B	TOP Assay	537 List: 24	Full List of 28	Other: Please List Below	PFOA/PFOs	UCMR3 PFAS List 8	PFAS List: 14	Comments
MW-19	11/7/19	1405		2	P	GW			X						
MW-20	11/7/19	1445		2	P	GW			X						
MW-21	11/7/19	1520		2	P	GW			X						
MW-22	11/7/19	1235		2	P	GW			X						
MW-23	11/7/19	1155		2	P	GW			X						
MW-24	11/6/19	1600		2	P	GW			X						
MW-25	11/6/19	935		2	P	GW			X						
MW-26	11/6/19	1010		2	P	GW			X						
MW-27	11/7/19	940		2	P	GW			X						
MW-28	11/6/19	1105		2	P	GW			X						

Special Instructions/Comments:

SEND
DOCUMENTATION
AND RESULTS TO:

Name: **Heather Gosack and Kelsi Evans**

Company: **see above**

Address:

City:

State:

Zip:

Phone:

Fax:

Email: **Heather.Gosack@apexcos.com; kelsi.evans@apexcos.com**

Container Types: P= HDPE, PJ= HDPE Jar

O = Other:

Bottle Preservation Type: T = Thiosulfate,

TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,

SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 1903989 TAT std

Samples Arrival:	Date/Time 11/12/19 10:00	Initials: HOG	Location: WR-2
			Shelf/Rack: NA
Delivered By:	☒ FedEx	☐ UPS	☐ On Trac
		☐ GSO	☐ DHL
		☐ Hand Delivered	☐ Other
Preservation:	☒ Ice	☐ Blue Ice	☐ Dry Ice
	☐ None		
Temp °C: 1.7 (uncorrected)	Probe used: Y / ☒ N		Thermometer ID: IR-4
Temp °C: 1.7 (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	☒	☐	☐
Shipping Custody Seals Intact?	☐	☐	☒
Airbill # \ Trk # 7769 5238 1957	☒	☐	☐
Shipping Documentation Present?	☒	☐	☐
Shipping Container	Vista	☒ Client	☐ Retain
		☒ Return	☐ Dispose
Chain of Custody / Sample Documentation Present?	☐	☒	☐
Chain of Custody / Sample Documentation Complete?	☐	☐	☒
Holding Time Acceptable?	☐	☐	☒

Logged In:	Date/Time 11/12/19 1631	Initials: WWS	Location: R-13, WR-2 ↓ ↓ Shelf/Rack: 8-3, F-6
COC Anomaly/Sample Acceptance Form completed?			☒ ☒ ☒

Comments:

WWS 11/13/19

Sample Log-In Checklist

Vista Work Order #: 19038 1903989 ^{WWS 11/12/19} Page # 1 of 1
 TAT std

Samples Arrival:	Date/Time 11/12/19 10:00		Initials: HOG		Location: WR-2		
		Shelf/Rack: NA					
Delivered By:	☒ FedEx	☐ UPS	☐ On Trac	☐ GSO	☐ DHL	☐ Hand Delivered	☐ Other
Preservation:	☒ Ice		☐ Blue Ice		☐ Dry Ice		☐ None
Temp °C: 1.9 (uncorrected)	Probe used: Y / N				Thermometer ID: IR-3		
Temp °C: 1.9 (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	☒	☐	☐
Shipping Custody Seals Intact?	☐	☐	☒
Airbill <u>—</u> Trk # <u>7769 5236 6133</u>	☒	☐	☐
Shipping Documentation Present?	☒	☐	☐
Shipping Container ☒ Vista	☐ Client	☒ Retain	☐ Return
Chain of Custody / Sample Documentation Present?	☒	☐	☐
Chain of Custody / Sample Documentation Complete?	☒	☐	☐
Holding Time Acceptable?	☒	☐	☐

Logged In:	Date/Time 11/12/19 1631	Initials: WWS	Location: R-13, WR-2 ↓ ↓ Shelf/Rack: 2-3, F-6
COC Anomaly/Sample Acceptance Form completed?			☒ ☒ ☒

Comments:

WWS 11/13/19

CoC/Label Reconciliation Report WO# 1903989

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	Sample BaseMatrix Comments
2	1903989-01 A MW-1		08-Nov-19 12:30 ☒	HDPE Bottle, 250 mL	Aqueous
2	1903989-01 B MW-1		08-Nov-19 12:30 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-02 A MW-3		08-Nov-19 12:30 ☐ * 1305	HDPE Bottle, 250 mL	Aqueous
1	1903989-02 B MW-3		08-Nov-19 12:30 ☐ * 1305	HDPE Bottle, 250 mL	Aqueous
1	1903989-03 A MW-4		08-Nov-19 13:45 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-03 B MW-4		08-Nov-19 13:45 ☒	HDPE Bottle, 250 mL	Aqueous
2	1903989-04 A MW-8		08-Nov-19 10:28 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-04 B MW-8		08-Nov-19 10:28 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-05 A MW-10A		08-Nov-19 11:50 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-05 B MW-10A		08-Nov-19 11:50 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-06 A MW-14		08-Nov-19 11:10 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-06 B MW-14		08-Nov-19 11:10 ☒	HDPE Bottle, 250 mL	Aqueous
2	1903989-07 A MW-15		08-Nov-19 09:45 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-07 B MW-15		08-Nov-19 09:45 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-08 A MW-16		07-Nov-19 10:30 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-08 B MW-16		07-Nov-19 10:30 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-09 A MW-17		07-Nov-19 11:10 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-09 B MW-17		07-Nov-19 11:10 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-10 A MW-18		07-Nov-19 13:35 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-10 B MW-18		07-Nov-19 13:35 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-11 A MW-19		07-Nov-19 14:05 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-11 B MW-19		07-Nov-19 14:05 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-12 A MW-20		07-Nov-19 14:45 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-12 B MW-20		07-Nov-19 14:45 ☒	HDPE Bottle, 250 mL	Aqueous
2	1903989-13 A MW-21		07-Nov-19 15:20 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-13 B MW-21		07-Nov-19 15:20 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-14 A MW-22		07-Nov-19 12:35 ☒	HDPE Bottle, 250 mL	Aqueous
	1903989-14 B MW-22		07-Nov-19 12:35 ☒	HDPE Bottle, 250 mL	Aqueous
1	1903989-15 A MW-23		07-Nov-19 11:55 ☒	HDPE Bottle, 250 mL	Aqueous

[illegible]

07-Nov-19 11:55	☒
06-Nov-19 16:00	☒
06-Nov-19 16:00	☒
06-Nov-19 09:35	☒
06-Nov-19 09:35	☒
06-Nov-19 10:10	☒
06-Nov-19 10:10	☐
07-Nov-19 09:40	☒
07-Nov-19 09:40	☒
06-Nov-19 11:05	☒
06-Nov-19 11:05	☒

[illegible]

Comments:

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na ₂ S ₂ O ₃ Trizma <u>None</u> Other		✓	✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

* Time does not recon, date & ID recon

ANOMALY FORM

Vista Work Order

1903989

Initial/Date The following checked issues were noted during sample receipt and login:

- _____ ☐ **1. The samples were received out of temperature at (WI-PHT):** _____
Was Ice present: Yes No Melted Blue Ice
- _____ ☐ 2. The Chain-of-Custody (CoC) was not relinquished properly.
- _____ ☐ 3. The CoC did not include collection time(s). 00:00 will be used unless notified otherwise.
- _____ ☐ 4. The sample(s) did not include a sample collection time. All or Sample Name: _____
- _____ ☐ 5. A sample ID discrepancy was found. See the Reconciliation report.
The CoC Sample ID will be used unless notified otherwise.
- 11/13/19 ☒ 6. A sample date and/or time discrepancy was found. See the Reconciliation report.
The CoC Sample date/time will be used unless notified otherwise.
- _____ ☐ 7. The CoC did not include a sample matrix. The following sample matrix will be used: _____
- _____ ☐ 8. Insufficient volume received for analysis. All or Sample Name: _____
- _____ ☐ 9. The backup bottle was received broken. Sample Name: _____
- _____ ☐ 10. CoC not received, illegible or destroyed.
- _____ ☐ 11. The sample(s) were received out of holding time. All or Sample Name: _____
- _____ ☐ 12. The CoC did not include an analysis. All or Sample Name: _____
- _____ ☐ 13. Sample(s) received without collection date. All or Sample Name: _____
- _____ ☐ 14. Sample(s) not received. All or Sample Name: _____
- _____ ☐ 15. Sample(s) received broken. All or Sample Name: _____
- _____ ☐ 16. An incorrect container-type was used. All or Sample Name: _____
- _____ ☐ 17. Other: _____

Bolded items require sign-off

Client Contacted: _____

Date of Contact: _____

Vista Client Manager: _____

Resolution: _____



December 16, 2019

Vista Work Order No. 1903993

Ms. Heather Gosack
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201

Dear Ms. Gosack,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 12, 2019 under your Project Name 'PDX Fire Training Facility'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1903993

Case Narrative

Sample Condition on Receipt:

Eleven groundwater, three water and three surface water samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

PFAS Isotope Dilution Method

The following samples contained particulate and were centrifuged prior to extraction:

<u>Laboratory ID</u>	<u>Sample Name</u>
1903993-01	MW-29
1903993-06	DW-1
1903993-07	DW-2
1903993-08	DW-3
1903993-09	DUP-1
1903993-11	DUP-3
1903993-16	SW-3
1903993-17	OFIN-NW

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above the Reporting Limit. The OPR recoveries were within the method acceptance criteria.

The internal standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1903993-09	DUP-1	PFAS Isotope Dilution Method	13C3-PFBA	H	45.8
1903993-09	DUP-1	PFAS Isotope Dilution Method	13C2-PFOA	H	143
1903993-11	DUP-3	PFAS Isotope Dilution Method	13C2-PFHxA	H	180
1903993-11	DUP-3	PFAS Isotope Dilution Method	13C2-6:2 FTS	H	634
1903993-11	DUP-3	PFAS Isotope Dilution Method	13C8-PFOS	H	18.0
1903993-14	Equip Blank 3	PFAS Isotope Dilution Method	13C8-PFOSA	H	19.2
1903993-15	SW-2	PFAS Isotope Dilution Method	13C8-PFOSA	H	18.9

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1903993-01	MW-29	06-Nov-19 11:55	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-02	MW-30	06-Nov-19 14:25	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-03	MW-31	06-Nov-19 13:00	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-04	MW-32	06-Nov-19 13:35	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-05	MW-33	07-Nov-19 08:55	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-06	DW-1	06-Nov-19 15:00	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-07	DW-2	08-Nov-19 09:12	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-08	DW-3	06-Nov-19 15:30	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-09	DUP-1	06-Nov-19 00:00	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-10	DUP-2	06-Nov-19 00:00	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-11	DUP-3	08-Nov-19 00:00	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-12	Equip Blank 1	06-Nov-19 16:12	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-13	Equip Blank 2	07-Nov-19 15:40	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-14	Equip Blank 3	08-Nov-19 14:20	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-15	SW-2	08-Nov-19 15:10	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-16	SW-3	08-Nov-19 15:30	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903993-17	OFIN-NW	08-Nov-19 14:35	12-Nov-19 10:00	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank					PFAS Isotope Dilution Method				
Client Data					Laboratory Data				
Name:	Apex Companies, LLC	Matrix:	Aqueous	Lab Sample:	B9K0127-BLK1	Column:	BEH C18		
Project:	PDX Fire Training Facility								
Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFPeA	2706-90-3	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFBS	375-73-5	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
4:2 FTS	757124-72-4	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFHxA	307-24-4	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFPeS	2706-91-4	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFHpA	375-85-9	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFHxS	355-46-4	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
6:2 FTS	27619-97-2	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFOA	335-67-1	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFHpS	375-92-8	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFNA	375-95-1	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFOSA	754-91-6	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFOS	1763-23-1	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFDA	335-76-2	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
8:2 FTS	39108-34-4	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFNS	68259-12-1	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
MeFOSAA	2355-31-9	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
EtFOSAA	2991-50-6	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFUnA	2058-94-8	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFDS	335-77-3	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFDoA	307-55-1	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFTTrDA	72629-94-8	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
PFTeDA	376-06-7	ND	2.00		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.0	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C3-PFPeA	IS	93.4	60 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C3-PFBS	IS	103	60 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C2-4:2 FTS	IS	91.6	20 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C2-PFHxA	IS	97.4	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C4-PFHpA	IS	99.6	60 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C3-PFHxS	IS	97.5	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C2-6:2 FTS	IS	85.2	40 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C5-PFNA	IS	101	50 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C8-PFOSA	IS	40.8	20 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C2-PFOA	IS	89.5	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C8-PFOS	IS	86.1	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1
13C2-PFDA	IS	90.0	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1

Sample ID: Method Blank					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: B9K0127-BLK1 Column: BEH C18					
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	91.8	40 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1	
d3-MeFOSAA	IS	80.2	50 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1	
13C2-PFUnA	IS	77.2	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1	
d5-EtFOSAA	IS	87.1	50 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1	
13C2-PFDoA	IS	72.9	30 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1	
13C2-PFTeDA	IS	67.6	20 - 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 07:20	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OPR						PFAS Isotope Dilution Method					
Client Data						Laboratory Data					
Name:	Apex Companies, LLC	Matrix:	Aqueous			Lab Sample:	B9K0127-BS1	Column:	BEH C18		
Project:	PDX Fire Training Facility										
Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	43.7	40.0	109	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFPeA	2706-90-3	42.8	40.0	107	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFBS	375-73-5	41.3	40.0	103	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
4:2 FTS	757124-72-4	48.8	40.0	122	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFHxA	307-24-4	28.5	40.0	71.3	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFPeS	2706-91-4	37.7	40.0	94.4	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFHpA	375-85-9	42.6	40.0	106	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFHxS	355-46-4	43.7	40.0	109	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
6:2 FTS	27619-97-2	35.5	40.0	88.8	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFOA	335-67-1	45.8	40.0	114	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFHpS	375-92-8	40.4	40.0	101	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFNA	375-95-1	40.5	40.0	101	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFOSA	754-91-6	46.4	40.0	116	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFOS	1763-23-1	44.4	40.1	111	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFDA	335-76-2	42.4	40.0	106	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
8:2 FTS	39108-34-4	46.4	40.0	116	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFNS	68259-12-1	38.4	40.0	95.9	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
MeFOSAA	2355-31-9	47.0	40.0	117	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
EtFOSAA	2991-50-6	38.2	40.0	95.6	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFUnA	2058-94-8	48.1	40.0	120	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFDS	335-77-3	32.3	40.1	80.5	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFDaA	307-55-1	45.6	40.0	114	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFTTrDA	72629-94-8	42.8	40.0	107	60 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
PFTeDA	376-06-7	47.9	40.0	120	70 - 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
Labeled Standards		Type		% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA		IS		91.8	60- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C3-PFPeA		IS		93.4	60- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C3-PFBS		IS		119	60- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C2-4:2 FTS		IS		96.7	20- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C2-PFHxA		IS		97.0	70- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C4-PFHpA		IS		98.4	60- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C3-PFHxS		IS		98.1	60- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C2-6:2 FTS		IS		88.1	40- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C5-PFNA		IS		108	50- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C8-PFOSA		IS		56.7	20- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1

Sample ID: OPR					PFAS Isotope Dilution Method				
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: B9K0127-BS1 Column: BEH C18				
Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	90.5	60- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C8-PFOS	IS	88.1	60- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C2-PFDA	IS	87.7	60- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C2-8:2 FTS	IS	84.7	40- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
d3-MeFOSAA	IS	73.9	50- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C2-PFUnA	IS	76.1	60- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
d5-EtFOSAA	IS	79.9	50- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C2-PFDoA	IS	73.9	30- 130		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1
13C2-PFTeDA	IS	75.2	20- 150		B9K0127	19-Nov-19	0.250 L	07-Dec-19 20:57	1

Sample ID: MW-29
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-01	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 11:55	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	160	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFPeA	2706-90-3	410	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFBS	375-73-5	48.6	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
4:2 FTS	757124-72-4	ND	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFHxA	307-24-4	246	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFPeS	2706-91-4	117	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFHpA	375-85-9	385	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFHxS	355-46-4	1660	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
6:2 FTS	27619-97-2	347	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFOA	335-67-1	307	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFHpS	375-92-8	11.2	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFNA	375-95-1	198	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFOSA	754-91-6	2.27	2.09	Q	B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFOS	1763-23-1	3350	10.5	D	B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:07	5
PFDA	335-76-2	7.38	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
8:2 FTS	39108-34-4	1880	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFNS	68259-12-1	9.31	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
MeFOSAA	2355-31-9	ND	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
EtFOSAA	2991-50-6	ND	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFUnA	2058-94-8	ND	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFDS	335-77-3	ND	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFDoA	307-55-1	ND	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFTTrDA	72629-94-8	ND	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
PFTeDA	376-06-7	ND	2.09		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.5	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C3-PFPeA	IS	95.3	60 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C3-PFBS	IS	117	60 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C2-4:2 FTS	IS	120	20 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C2-PFHxA	IS	99.6	70 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C4-PFHpA	IS	93.2	60 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C3-PFHxS	IS	110	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C2-6:2 FTS	IS	108	40 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C5-PFNA	IS	96.0	50 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C8-PFOSA	IS	60.7	20 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C2-PFOA	IS	96.3	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1
13C8-PFOS	IS	110	60 - 130	D	B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:07	5
13C2-PFDA	IS	91.4	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1

Sample ID: MW-29					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility Matrix: Groundwater Date Collected: 06-Nov-19 11:55					Laboratory Data Lab Sample: 1903993-01 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	101	40 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1	
d3-MeFOSAA	IS	86.1	50 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1	
13C2-PFUnA	IS	81.4	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1	
d5-EtFOSAA	IS	86.4	50 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1	
13C2-PFDoA	IS	76.3	30 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1	
13C2-PFTeDA	IS	68.6	20 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 21:18	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-30
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-02	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 14:25	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFPeA	2706-90-3	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFBS	375-73-5	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
4:2 FTS	757124-72-4	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFHxA	307-24-4	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFPeS	2706-91-4	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFHpA	375-85-9	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFHxS	355-46-4	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
6:2 FTS	27619-97-2	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFOA	335-67-1	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFHpS	375-92-8	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFNA	375-95-1	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFOSA	754-91-6	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFOS	1763-23-1	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFDA	335-76-2	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
8:2 FTS	39108-34-4	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFNS	68259-12-1	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
MeFOSAA	2355-31-9	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
EtFOSAA	2991-50-6	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFAA	2058-94-8	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFDS	335-77-3	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFDoA	307-55-1	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFTTrDA	72629-94-8	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
PFTeDA	376-06-7	ND	2.10		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	89.9	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C3-PFPeA	IS	91.5	60 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C3-PFBS	IS	78.1	60 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C2-4:2 FTS	IS	83.4	20 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C2-PFHxA	IS	90.5	70 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C4-PFHpA	IS	91.8	60 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C3-PFHxS	IS	93.3	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C2-6:2 FTS	IS	88.5	40 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C5-PFNA	IS	105	50 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C8-PFOSA	IS	50.4	20 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C2-PFOA	IS	92.1	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C8-PFOS	IS	77.2	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1
13C2-PFDA	IS	96.4	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1

Sample ID: MW-30					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-02 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 14:25										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	79.5	40 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1	
d3-MeFOSAA	IS	83.3	50 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1	
13C2-PFUnA	IS	83.5	60 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1	
d5-EtFOSAA	IS	87.4	50 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1	
13C2-PFDoA	IS	78.9	30 - 130		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1	
13C2-PFTeDA	IS	70.6	20 - 150		B9K0127	19-Nov-19	0.239 L	07-Dec-19 07:52	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-31
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-03	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 13:00	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	81.7	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFPeA	2706-90-3	392	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFBS	375-73-5	57.7	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
4:2 FTS	757124-72-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFHxA	307-24-4	283	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFPeS	2706-91-4	46.9	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFHpA	375-85-9	308	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFHxS	355-46-4	542	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
6:2 FTS	27619-97-2	77.6	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFOA	335-67-1	1230	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFHpS	375-92-8	2.39	2.02	Q	B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFNA	375-95-1	8.89	2.02	Q	B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFOSA	754-91-6	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFOS	1763-23-1	26.5	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFDA	335-76-2	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
8:2 FTS	39108-34-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFNS	68259-12-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
MeFOSAA	2355-31-9	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
EtFOSAA	2991-50-6	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFUnA	2058-94-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFDS	335-77-3	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFDoA	307-55-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFTTrDA	72629-94-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
PFTeDA	376-06-7	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.9	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C3-PFPeA	IS	91.3	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C3-PFBS	IS	123	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C2-4:2 FTS	IS	108	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C2-PFHxA	IS	98.4	70 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C4-PFHpA	IS	97.8	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C3-PFHxS	IS	109	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C2-6:2 FTS	IS	85.3	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C5-PFNA	IS	103	50 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C8-PFOSA	IS	26.1	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C2-PFOA	IS	97.2	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C8-PFOS	IS	96.9	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1
13C2-PFDA	IS	105	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1

Sample ID: MW-31					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-03 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 13:00										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	88.9	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1	
d3-MeFOSAA	IS	112	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1	
13C2-PFUnA	IS	84.4	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1	
d5-EtFOSAA	IS	116	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1	
13C2-PFDoA	IS	82.6	30 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1	
13C2-PFTeDA	IS	65.9	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:02	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-32					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-04 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBA	375-22-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFPeA	2706-90-3	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFBS	375-73-5	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
4:2 FTS	757124-72-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFHxA	307-24-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFPeS	2706-91-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFHpA	375-85-9	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFHxS	355-46-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
6:2 FTS	27619-97-2	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFOA	335-67-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFHpS	375-92-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFNA	375-95-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFOSA	754-91-6	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFOS	1763-23-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFDA	335-76-2	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
8:2 FTS	39108-34-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFNS	68259-12-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
MeFOSAA	2355-31-9	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
EtFOSAA	2991-50-6	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFUnA	2058-94-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFDS	335-77-3	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFDoA	307-55-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFTTrDA	72629-94-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
PFTeDA	376-06-7	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBA	IS	100	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C3-PFPeA	IS	93.1	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C3-PFBS	IS	98.3	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C2-4:2 FTS	IS	94.9	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C2-PFHxA	IS	98.6	70 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C4-PFHpA	IS	96.1	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C3-PFHxS	IS	87.7	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C2-6:2 FTS	IS	91.7	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C5-PFNA	IS	92.9	50 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C8-PFOSA	IS	67.6	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C2-PFOA	IS	97.1	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C8-PFOS	IS	93.1	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C2-PFDA	IS	106	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	

Sample ID: MW-32					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-04 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 13:35										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	95.2	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
d3-MeFOSAA	IS	79.9	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C2-PFUnA	IS	91.1	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
d5-EtFOSAA	IS	77.1	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C2-PFDoA	IS	94.3	30 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	
13C2-PFTeDA	IS	68.3	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 21:39	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: MW-33

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-05	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 08:55	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	2.55	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFPeA	2706-90-3	3.79	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFBS	375-73-5	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
4:2 FTS	757124-72-4	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFHxA	307-24-4	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFPeS	2706-91-4	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFHpA	375-85-9	2.38	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFHxS	355-46-4	10.6	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
6:2 FTS	27619-97-2	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFOA	335-67-1	6.54	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFHpS	375-92-8	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFNA	375-95-1	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFOSA	754-91-6	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFOS	1763-23-1	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFDA	335-76-2	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
8:2 FTS	39108-34-4	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFNS	68259-12-1	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
MeFOSAA	2355-31-9	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
EtFOSAA	2991-50-6	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFUnA	2058-94-8	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFDS	335-77-3	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFDoA	307-55-1	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFTTrDA	72629-94-8	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
PFTeDA	376-06-7	ND	2.03		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.2	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C3-PFPeA	IS	88.4	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C3-PFBS	IS	86.9	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C2-4:2 FTS	IS	89.3	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C2-PFHxA	IS	95.8	70 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C4-PFHpA	IS	93.4	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C3-PFHxS	IS	96.4	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C2-6:2 FTS	IS	95.5	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C5-PFNA	IS	95.9	50 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C8-PFOSA	IS	49.7	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C2-PFOA	IS	95.0	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C8-PFOS	IS	99.3	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1
13C2-PFDA	IS	102	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1

Sample ID: MW-33					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-05 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 07-Nov-19 08:55										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	91.3	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1	
d3-MeFOSAA	IS	88.1	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1	
13C2-PFUnA	IS	81.9	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1	
d5-EtFOSAA	IS	94.8	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1	
13C2-PFDoA	IS	79.7	30 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1	
13C2-PFTeDA	IS	67.8	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:23	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: DW-1
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-06	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 15:00	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFPeA	2706-90-3	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFBS	375-73-5	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
4:2 FTS	757124-72-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFHxA	307-24-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFPeS	2706-91-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFHpA	375-85-9	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFHxS	355-46-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
6:2 FTS	27619-97-2	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFOA	335-67-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFHpS	375-92-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFNA	375-95-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFOSA	754-91-6	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFOS	1763-23-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFDA	335-76-2	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
8:2 FTS	39108-34-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFNS	68259-12-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
MeFOSAA	2355-31-9	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
EtFOSAA	2991-50-6	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFOA	2058-94-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFDS	335-77-3	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFDoA	307-55-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFTTrDA	72629-94-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
PFTeDA	376-06-7	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	90.9	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C3-PFPeA	IS	91.6	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C3-PFBS	IS	101	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C2-4:2 FTS	IS	91.0	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C2-PFHxA	IS	95.4	70 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C4-PFHpA	IS	97.3	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C3-PFHxS	IS	88.5	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C2-6:2 FTS	IS	86.0	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C5-PFNA	IS	84.9	50 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C8-PFOA	IS	33.9	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C2-PFOA	IS	86.5	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C8-PFOS	IS	85.3	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1
13C2-PFDA	IS	81.6	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1

Sample ID: DW-1					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-06 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 15:00										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	81.7	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1	
d3-MeFOSAA	IS	75.7	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1	
13C2-PFUnA	IS	77.0	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1	
d5-EtFOSAA	IS	93.3	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1	
13C2-PFDoA	IS	71.6	30 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1	
13C2-PFTeDA	IS	42.5	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 08:55	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: DW-2
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-07	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 09:12	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFPeA	2706-90-3	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFBS	375-73-5	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
4:2 FTS	757124-72-4	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFHxA	307-24-4	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFPeS	2706-91-4	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFHpA	375-85-9	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFHxS	355-46-4	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
6:2 FTS	27619-97-2	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFOA	335-67-1	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFHpS	375-92-8	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFNA	375-95-1	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFOSA	754-91-6	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFOS	1763-23-1	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFDA	335-76-2	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
8:2 FTS	39108-34-4	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFNS	68259-12-1	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
MeFOSAA	2355-31-9	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
EtFOSAA	2991-50-6	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFUnA	2058-94-8	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFDS	335-77-3	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFDoA	307-55-1	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFTTrDA	72629-94-8	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
PFTeDA	376-06-7	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	87.6	60 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C3-PFPeA	IS	89.8	60 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C3-PFBS	IS	104	60 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C2-4:2 FTS	IS	104	20 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C2-PFHxA	IS	94.5	70 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C4-PFHpA	IS	94.7	60 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C3-PFHxS	IS	95.6	60 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C2-6:2 FTS	IS	96.7	40 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C5-PFNA	IS	93.6	50 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C8-PFOSA	IS	44.0	20 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C2-PFOA	IS	93.0	60 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C8-PFOS	IS	93.9	60 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1
13C2-PFDA	IS	89.2	60 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1

Sample ID: DW-2					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-07 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 08-Nov-19 09:12										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	83.3	40 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1	
d3-MeFOSAA	IS	86.8	50 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1	
13C2-PFUnA	IS	79.1	60 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1	
d5-EtFOSAA	IS	97.7	50 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1	
13C2-PFDoA	IS	68.9	30 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1	
13C2-PFTeDA	IS	61.9	20 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:05	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: DW-3

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-08	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 15:30	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFPeA	2706-90-3	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFBS	375-73-5	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
4:2 FTS	757124-72-4	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFHxA	307-24-4	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFPeS	2706-91-4	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFHpA	375-85-9	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFHxS	355-46-4	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
6:2 FTS	27619-97-2	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFOA	335-67-1	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFHpS	375-92-8	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFNA	375-95-1	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFOSA	754-91-6	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFOS	1763-23-1	3.47	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFDA	335-76-2	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
8:2 FTS	39108-34-4	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFNS	68259-12-1	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
MeFOSAA	2355-31-9	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
EtFOSAA	2991-50-6	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFOA	2058-94-8	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFDS	335-77-3	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFDoA	307-55-1	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFTTrDA	72629-94-8	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
PFTeDA	376-06-7	ND	2.13		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.6	60 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C3-PFPeA	IS	95.8	60 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C3-PFBS	IS	90.7	60 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C2-4:2 FTS	IS	107	20 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C2-PFHxA	IS	95.9	70 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C4-PFHpA	IS	98.9	60 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C3-PFHxS	IS	93.8	60 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C2-6:2 FTS	IS	93.0	40 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C5-PFNA	IS	99.3	50 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C8-PFOA	IS	45.7	20 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C2-PFOA	IS	91.5	60 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C8-PFOS	IS	101	60 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1
13C2-PFDA	IS	92.1	60 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1

Sample ID: DW-3					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-08 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 15:30										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	86.9	40 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1	
d3-MeFOSAA	IS	86.8	50 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1	
13C2-PFUnA	IS	83.0	60 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1	
d5-EtFOSAA	IS	113	50 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1	
13C2-PFDoA	IS	67.1	30 - 130		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1	
13C2-PFTeDA	IS	62.2	20 - 150		B9K0127	19-Nov-19	0.235 L	07-Dec-19 09:16	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: DUP-1
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-09	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 00:00	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	89.1	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFPeA	2706-90-3	402	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFBS	375-73-5	29.2	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
4:2 FTS	757124-72-4	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFHxA	307-24-4	493	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFPeS	2706-91-4	20.5	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFHpA	375-85-9	471	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFHxS	355-46-4	324	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
6:2 FTS	27619-97-2	12.4	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFOA	335-67-1	18400	30.6	D	B9K0127	19-Nov-19	0.245 L	10-Dec-19 09:56	15
PFHpS	375-92-8	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFNA	375-95-1	10.2	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFOSA	754-91-6	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFOS	1763-23-1	11.6	2.04	Q	B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFDA	335-76-2	2.17	2.04	Q	B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
8:2 FTS	39108-34-4	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFNS	68259-12-1	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
MeFOSAA	2355-31-9	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
EtFOSAA	2991-50-6	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFOA	2058-94-8	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFDS	335-77-3	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFDoA	307-55-1	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFTTrDA	72629-94-8	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
PFTeDA	376-06-7	ND	2.04		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	45.8	60 - 130	H	B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C3-PFPeA	IS	84.2	60 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C3-PFBS	IS	90.2	60 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C2-4:2 FTS	IS	74.6	20 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C2-PFHxA	IS	87.8	70 - 130		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C4-PFHpA	IS	93.7	60 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C3-PFHxS	IS	100	60 - 130		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C2-6:2 FTS	IS	104	40 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C5-PFNA	IS	96.2	50 - 130		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C8-PFOA	IS	37.3	20 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C2-PFOA	IS	143	60 - 130	D, H	B9K0127	19-Nov-19	0.245 L	10-Dec-19 09:56	15
13C8-PFOS	IS	100	60 - 130		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1
13C2-PFDA	IS	89.4	60 - 130		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1

Sample ID: DUP-1					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-09 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 00:00										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	100	40 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1	
d3-MeFOSAA	IS	82.7	50 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1	
13C2-PFUnA	IS	78.7	60 - 130		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1	
d5-EtFOSAA	IS	98.3	50 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1	
13C2-PFDoA	IS	71.5	30 - 130		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1	
13C2-PFTeDA	IS	75.1	20 - 150		B9K0127	19-Nov-19	0.245 L	07-Dec-19 09:27	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: DUP-2
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-10	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 00:00	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	79.0	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFPeA	2706-90-3	383	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFBS	375-73-5	60.1	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
4:2 FTS	757124-72-4	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFHxA	307-24-4	256	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFPeS	2706-91-4	53.7	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFHpA	375-85-9	273	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFHxS	355-46-4	516	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
6:2 FTS	27619-97-2	68.0	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFOA	335-67-1	1200	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFHpS	375-92-8	2.39	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFNA	375-95-1	7.99	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFOSA	754-91-6	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFOS	1763-23-1	32.5	2.04	Q	B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFDA	335-76-2	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
8:2 FTS	39108-34-4	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFNS	68259-12-1	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
MeFOSAA	2355-31-9	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
EtFOSAA	2991-50-6	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFA	2058-94-8	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFDS	335-77-3	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFDoA	307-55-1	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFTTrDA	72629-94-8	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
PFTeDA	376-06-7	ND	2.04		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.5	60 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C3-PFPeA	IS	88.0	60 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C3-PFBS	IS	96.9	60 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C2-4:2 FTS	IS	115	20 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C2-PFHxA	IS	99.2	70 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C4-PFHpA	IS	98.5	60 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C3-PFHxS	IS	97.5	60 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C2-6:2 FTS	IS	81.9	40 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C5-PFNA	IS	89.6	50 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C8-PFOSA	IS	39.2	20 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C2-PFOA	IS	96.6	60 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C8-PFOS	IS	77.8	60 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1
13C2-PFDA	IS	95.4	60 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1

Sample ID: DUP-2					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-10 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 06-Nov-19 00:00										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	117	40 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1	
d3-MeFOSAA	IS	70.1	50 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1	
13C2-PFUnA	IS	83.6	60 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1	
d5-EtFOSAA	IS	93.0	50 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1	
13C2-PFDoA	IS	72.1	30 - 130		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1	
13C2-PFTeDA	IS	73.3	20 - 150		B9K0127	19-Nov-19	0.246 L	12-Dec-19 19:58	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: DUP-3
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Groundwater	Lab Sample:	1903993-11	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 00:00	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	8940	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFPeA	2706-90-3	32800	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFBS	375-73-5	3550	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
4:2 FTS	757124-72-4	974	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
PFHxA	307-24-4	11700	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFPeS	2706-91-4	5290	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFHpA	375-85-9	11000	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFHxS	355-46-4	25200	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
6:2 FTS	27619-97-2	15700	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFOA	335-67-1	9050	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFHpS	375-92-8	4780	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFNA	375-95-1	343	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
PFOSA	754-91-6	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
PFOS	1763-23-1	77400	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFDA	335-76-2	10.8	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
8:2 FTS	39108-34-4	6090	103	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
PFNS	68259-12-1	109	2.06	Q	B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
MeFOSAA	2355-31-9	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
EtFOSAA	2991-50-6	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
PFUnA	2058-94-8	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
PFDS	335-77-3	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
PFDoA	307-55-1	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
PFTTrDA	72629-94-8	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
PFTeDA	376-06-7	ND	2.06		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	77.3	60 - 130	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C3-PFPeA	IS	75.8	60 - 150	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C3-PFBS	IS	102	60 - 150	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C2-4:2 FTS	IS	122	20 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
13C2-PFHxA	IS	180	70 - 130	D, H	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C4-PFHpA	IS	80.8	60 - 150	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C3-PFHxS	IS	84.3	60 - 130	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C2-6:2 FTS	IS	634	40 - 150	D, H	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C5-PFNA	IS	94.0	50 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
13C8-PFOSA	IS	43.3	20 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1
13C2-PFOA	IS	103	60 - 130	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C8-PFOS	IS	18.0	60 - 130	D, H	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50
13C2-PFDA	IS	83.5	60 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1

Sample ID: DUP-3					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-11 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Groundwater Date Collected: 08-Nov-19 00:00										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	86.9	40 - 150	D	B9K0127	19-Nov-19	0.243 L	07-Dec-19 10:16	50	
d3-MeFOSAA	IS	83.9	50 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1	
13C2-PFUnA	IS	73.9	60 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1	
d5-EtFOSAA	IS	89.3	50 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1	
13C2-PFDoA	IS	73.0	30 - 130		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1	
13C2-PFTeDA	IS	72.5	20 - 150		B9K0127	19-Nov-19	0.243 L	07-Dec-19 09:47	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: Equip Blank 1
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Water	Lab Sample:	1903993-12	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	06-Nov-19 16:12	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFPeA	2706-90-3	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFBS	375-73-5	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
4:2 FTS	757124-72-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFHxA	307-24-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFPeS	2706-91-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFHpA	375-85-9	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFHxS	355-46-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
6:2 FTS	27619-97-2	2.35	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFOA	335-67-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFHpS	375-92-8	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFNA	375-95-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFOSA	754-91-6	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFOS	1763-23-1	3.53	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFDA	335-76-2	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
8:2 FTS	39108-34-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFNS	68259-12-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
MeFOSAA	2355-31-9	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
EtFOSAA	2991-50-6	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFAUnA	2058-94-8	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFDS	335-77-3	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFDoA	307-55-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFTTrDA	72629-94-8	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
PFTeDA	376-06-7	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.0	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C3-PFPeA	IS	91.8	60 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C3-PFBS	IS	93.4	60 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C2-4:2 FTS	IS	92.8	20 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C2-PFHxA	IS	99.3	70 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C4-PFHpA	IS	101	60 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C3-PFHxS	IS	106	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C2-6:2 FTS	IS	88.1	40 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C5-PFNA	IS	102	50 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C8-PFOSA	IS	29.3	20 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C2-PFOA	IS	94.0	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C8-PFOS	IS	87.2	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1
13C2-PFDA	IS	87.9	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1

Sample ID: Equip Blank 1					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-12 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Water Date Collected: 06-Nov-19 16:12										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	90.4	40 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1	
d3-MeFOSAA	IS	70.4	50 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1	
13C2-PFUnA	IS	88.8	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1	
d5-EtFOSAA	IS	99.2	50 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1	
13C2-PFDoA	IS	76.0	30 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1	
13C2-PFTeDA	IS	77.7	20 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:48	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: Equip Blank 2
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Water	Lab Sample:	1903993-13	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	07-Nov-19 15:40	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFPeA	2706-90-3	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFBS	375-73-5	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
4:2 FTS	757124-72-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFHxA	307-24-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFPeS	2706-91-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFHpA	375-85-9	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFHxS	355-46-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
6:2 FTS	27619-97-2	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFOA	335-67-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFHpS	375-92-8	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFNA	375-95-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFOSA	754-91-6	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFOS	1763-23-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFDA	335-76-2	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
8:2 FTS	39108-34-4	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFNS	68259-12-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
MeFOSAA	2355-31-9	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
EtFOSAA	2991-50-6	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFUnA	2058-94-8	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFDS	335-77-3	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFDoA	307-55-1	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFTTrDA	72629-94-8	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
PFTeDA	376-06-7	ND	2.01		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.7	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C3-PFPeA	IS	93.5	60 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C3-PFBS	IS	81.6	60 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C2-4:2 FTS	IS	95.3	20 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C2-PFHxA	IS	97.2	70 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C4-PFHpA	IS	102	60 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C3-PFHxS	IS	104	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C2-6:2 FTS	IS	101	40 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C5-PFNA	IS	102	50 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C8-PFOSA	IS	30.1	20 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C2-PFOA	IS	91.3	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C8-PFOS	IS	91.0	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1
13C2-PFDA	IS	98.4	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1

Sample ID: Equip Blank 2					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-13 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Water Date Collected: 07-Nov-19 15:40										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	91.7	40 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1	
d3-MeFOSAA	IS	87.5	50 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1	
13C2-PFUnA	IS	91.6	60 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1	
d5-EtFOSAA	IS	88.3	50 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1	
13C2-PFDoA	IS	80.9	30 - 130		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1	
13C2-PFTeDA	IS	74.5	20 - 150		B9K0127	19-Nov-19	0.249 L	07-Dec-19 10:59	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: Equip Blank 3
PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Water	Lab Sample:	1903993-14	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 14:20	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFPeA	2706-90-3	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFBS	375-73-5	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
4:2 FTS	757124-72-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFHxA	307-24-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFPeS	2706-91-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFHpA	375-85-9	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFHxS	355-46-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
6:2 FTS	27619-97-2	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFOA	335-67-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFHpS	375-92-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFNA	375-95-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFOSA	754-91-6	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFOS	1763-23-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFDA	335-76-2	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
8:2 FTS	39108-34-4	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFNS	68259-12-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
MeFOSAA	2355-31-9	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
EtFOSAA	2991-50-6	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PfUnA	2058-94-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFDS	335-77-3	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFDoA	307-55-1	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFTTrDA	72629-94-8	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
PFTeDA	376-06-7	ND	2.02		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.5	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C3-PFPeA	IS	92.4	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C3-PFBS	IS	95.8	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C2-4:2 FTS	IS	108	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C2-PFHxA	IS	100	70 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C4-PFHpA	IS	106	60 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C3-PFHxS	IS	105	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C2-6:2 FTS	IS	90.9	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C5-PFNA	IS	97.5	50 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C8-PFOSA	IS	19.2	20 - 150	H	B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C2-PFOA	IS	97.9	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C8-PFOS	IS	95.9	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1
13C2-PFDA	IS	97.6	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1

Sample ID: Equip Blank 3					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-14 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Water Date Collected: 08-Nov-19 14:20										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	87.6	40 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1	
d3-MeFOSAA	IS	85.2	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1	
13C2-PFUnA	IS	83.9	60 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1	
d5-EtFOSAA	IS	86.5	50 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1	
13C2-PFDoA	IS	80.3	30 - 130		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1	
13C2-PFTeDA	IS	74.8	20 - 150		B9K0127	19-Nov-19	0.247 L	07-Dec-19 11:09	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: SW-2

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Surface Water	Lab Sample:	1903993-15	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 15:10	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	14.9	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFPeA	2706-90-3	50.2	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFBS	375-73-5	3.90	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
4:2 FTS	757124-72-4	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFHxA	307-24-4	33.3	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFPeS	2706-91-4	4.01	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFHpA	375-85-9	19.4	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFHxS	355-46-4	22.2	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
6:2 FTS	27619-97-2	57.4	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFOA	335-67-1	37.7	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFHpS	375-92-8	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFNA	375-95-1	7.79	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFOSA	754-91-6	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFOS	1763-23-1	90.2	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFDA	335-76-2	3.28	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
8:2 FTS	39108-34-4	12.9	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFNS	68259-12-1	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
MeFOSAA	2355-31-9	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
EtFOSAA	2991-50-6	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFUnA	2058-94-8	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFDS	335-77-3	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFDoA	307-55-1	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFTTrDA	72629-94-8	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
PFTeDA	376-06-7	ND	2.14		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.2	60 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C3-PFPeA	IS	93.1	60 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C3-PFBS	IS	96.5	60 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C2-4:2 FTS	IS	94.3	20 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C2-PFHxA	IS	95.4	70 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C4-PFHpA	IS	99.1	60 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C3-PFHxS	IS	102	60 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C2-6:2 FTS	IS	82.3	40 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C5-PFNA	IS	98.6	50 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C8-PFOSA	IS	18.9	20 - 150	H	B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C2-PFOA	IS	94.0	60 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C8-PFOS	IS	93.3	60 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1
13C2-PFDA	IS	95.4	60 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1

Sample ID: SW-2					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-15 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Surface Water Date Collected: 08-Nov-19 15:10										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	84.0	40 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1	
d3-MeFOSAA	IS	81.2	50 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1	
13C2-PFUnA	IS	83.0	60 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1	
d5-EtFOSAA	IS	91.6	50 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1	
13C2-PFDoA	IS	77.8	30 - 130		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1	
13C2-PFTeDA	IS	70.4	20 - 150		B9K0127	19-Nov-19	0.234 L	07-Dec-19 11:20	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: SW-3

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Surface Water	Lab Sample:	1903993-16	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 15:30	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	27.9	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFPeA	2706-90-3	121	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFBS	375-73-5	9.44	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
4:2 FTS	757124-72-4	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFHxA	307-24-4	83.7	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFPeS	2706-91-4	9.59	2.18	Q	B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFHpA	375-85-9	41.1	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFHxS	355-46-4	56.9	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
6:2 FTS	27619-97-2	240	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFOA	335-67-1	93.8	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFHpS	375-92-8	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFNA	375-95-1	10.3	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFOSA	754-91-6	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFOS	1763-23-1	141	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFDA	335-76-2	5.19	2.18	Q	B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
8:2 FTS	39108-34-4	16.3	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFNS	68259-12-1	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
MeFOSAA	2355-31-9	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
EtFOSAA	2991-50-6	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFUnA	2058-94-8	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFDS	335-77-3	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFDoA	307-55-1	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFTTrDA	72629-94-8	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
PFTeDA	376-06-7	ND	2.18		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.9	60 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C3-PFPeA	IS	96.6	60 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C3-PFBS	IS	101	60 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C2-4:2 FTS	IS	92.3	20 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C2-PFHxA	IS	98.4	70 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C4-PFHpA	IS	96.2	60 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C3-PFHxS	IS	95.1	60 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C2-6:2 FTS	IS	82.9	40 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C5-PFNA	IS	97.3	50 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C8-PFOSA	IS	40.2	20 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C2-PFOA	IS	101	60 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C8-PFOS	IS	84.4	60 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1
13C2-PFDA	IS	94.1	60 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1

Sample ID: SW-3					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-16 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Surface Water Date Collected: 08-Nov-19 15:30										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	92.9	40 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1	
d3-MeFOSAA	IS	81.1	50 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1	
13C2-PFUnA	IS	87.9	60 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1	
d5-EtFOSAA	IS	97.4	50 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1	
13C2-PFDoA	IS	84.2	30 - 130		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1	
13C2-PFTeDA	IS	71.0	20 - 150		B9K0127	19-Nov-19	0.229 L	07-Dec-19 22:00	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OFIN-NW

PFAS Isotope Dilution Method

Client Data				Laboratory Data			
Name:	Apex Companies, LLC	Matrix:	Surface Water	Lab Sample:	1903993-17	Column:	BEH C18
Project:	PDX Fire Training Facility	Date Collected:	08-Nov-19 14:35	Date Received:	12-Nov-19 10:00		

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	52.7	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFPeA	2706-90-3	190	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFBS	375-73-5	13.6	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
4:2 FTS	757124-72-4	4.81	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFHxA	307-24-4	141	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFPeS	2706-91-4	19.8	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFHpA	375-85-9	66.0	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFHxS	355-46-4	117	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
6:2 FTS	27619-97-2	1060	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFOA	335-67-1	147	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFHpS	375-92-8	3.19	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFNA	375-95-1	8.28	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFOSA	754-91-6	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFOS	1763-23-1	302	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFDA	335-76-2	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
8:2 FTS	39108-34-4	44.5	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFNS	68259-12-1	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
MeFOSAA	2355-31-9	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
EtFOSAA	2991-50-6	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFUnA	2058-94-8	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFDS	335-77-3	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFDoA	307-55-1	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFTTrDA	72629-94-8	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
PFTeDA	376-06-7	ND	2.13		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.2	60 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C3-PFPeA	IS	96.6	60 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C3-PFBS	IS	97.5	60 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C2-4:2 FTS	IS	112	20 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C2-PFHxA	IS	99.4	70 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C4-PFHpA	IS	97.3	60 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C3-PFHxS	IS	96.1	60 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C2-6:2 FTS	IS	85.5	40 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C5-PFNA	IS	96.6	50 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C8-PFOSA	IS	24.4	20 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C2-PFOA	IS	98.0	60 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C8-PFOS	IS	96.6	60 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1
13C2-PFDA	IS	103	60 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1

Sample ID: OFIN-NW					PFAS Isotope Dilution Method					
Client Data Name: Apex Companies, LLC Project: PDX Fire Training Facility					Laboratory Data Lab Sample: 1903993-17 Date Received: 12-Nov-19 10:00 Column: BEH C18					
Matrix: Surface Water Date Collected: 08-Nov-19 14:35										
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-8:2 FTS	IS	89.5	40 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1	
d3-MeFOSAA	IS	89.6	50 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1	
13C2-PFUnA	IS	77.8	60 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1	
d5-EtFOSAA	IS	92.8	50 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1	
13C2-PFDoA	IS	80.2	30 - 130		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1	
13C2-PFTeDA	IS	79.8	20 - 150		B9K0127	19-Nov-19	0.235 L	12-Dec-19 20:08	1	

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



CHAIN OF CUSTODY

For Laboratory Use Only

Work Order #: 1903993 Temp: 19.17 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☒ No ☐

Project ID: PDX Fire Training Facility PO#: 1264-06 Sampler: Kyle Kline
(name)

TAT Standard: ☒ 21 days
(check one): Rush (surcharge may apply)
☐ 14 days ☐ 7 days Specify: _____

Invoice to: Name Company Address City State Ph# Fax#
Heather Gosack Apex Companies 3015 SW 1st Ave Portland OR 503-924-4704

Relinquished by (printed name and signature) Date Time Received by (printed name and signature) Date Time
Kyle Kline [Signature] 11/10/19 1130 Haylen Gana [Signature] 11/12/19 10:00
Relinquished by (printed name and signature) Date Time Received by (printed name and signature) Date Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: _____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Container(s)

Mod. EPA
Method 537

EPA Method
537(DW
only)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	ADONA Gen-X F53-B	TOP Assay	537 List: 24	Full List of 28	Other: Please List Below	PFOA/PFOS	UCMR3 PFAS List 8	PFAS List: 14	Comments
MW-29	11/6/19	1155		2	P	GW			X						
MW-30	11/6/19	1425		2	P	GW			X						
MW-31	11/6/19	1300		2	P	GW			X						
MW-32	11/6/19	1335		2	P	GW			X						
MW-33	11/7/19	855		2	P	GW			X						
DW-1	11/6/19	1500		2	P	GW			X						
DW-2	11/8/19	912		2	P	GW			X						
DW-3	11/6/19	1530		2	P	GW			X						
DUP-1	11/6/19	-		2	P	GW			X						
DUP-2	11/6/19	-		2	P	GW			X						

Special Instructions/Comments: _____

SEND
DOCUMENTATION
AND RESULTS TO:

Name: Heather Gosack and Kelsi Evans
Company: see above
Address: _____
City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____
Email: Heather.Gosack@apexc.com; kelsi.evans@apexc.com

Container Types: P= HDPE, PJ= HDPE Jar
O = Other: _____

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma: _____

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,
SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: _____



CHAIN OF CUSTODY

For Laboratory Use Only

Work Order #: 1903993 Temp: 19.17 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☒ No ☐

Project ID: PDX Fire Training Facility PO#: 1264-06 Sampler: Kyle Kline
(name)

TAT Standard: ☒ 21 days
(check one): Rush (surcharge may apply)
☐ 14 days ☐ 7 days Specify: _____

Invoice to: Name Company Address City State Ph# Fax#
Heather Gosack Apex Companies 3015 SW 1st Ave Portland OR 503-924-4704

Relinquished by (printed name and signature) Date Time Received by (printed name and signature) Date Time
Kyle Kline [Signature] 11/11/19 1130 Hayden Ganas [Signature] 11/12/19 10:00
Relinquished by (printed name and signature) Date Time Received by (printed name and signature) Date Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: _____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Container(s)

Mod. EPA
Method 537

EPA Method
537(DW
only)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	ADONA Gen-X, F53-B	TOP Assay	537 List: 24	Full List of 28	Other: Please List Below	PFOA/PFOs	UCMR3 PFAS List 8	PFAS List: 14	Comments
DUP-3	11/8/19	-		2	P	GW			X						
Equip Blank 1	11/6/19	1612		2	P	W			X						
Equip Blank 2	11/7/19	1540		2	P	W			X						
Equip Blank 3	11/8/19	1420		2	P	W			X						
SW-2	11/8/19	1510		2	P	SW			X						
SW-3	11/8/19	1530		2	P	SW			X						
OF1N-NW	11/8/19	1435		2	P	SW			X						

Special Instructions/Comments: _____

SEND
DOCUMENTATION
AND RESULTS TO:

Name: Heather Gosack and Kelsi Evans
Company: see above
Address: _____
City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____
Email: Heather.Gosack@apexc.com; kelsi.evans@apexc.com

Container Types: P= HDPE, PJ= HDPE Jar
O = Other: _____

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma: _____

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,
SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: _____



Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903993

TAT std

Samples Arrival:	Date/Time 11/12/19 10:00	Initials: HOG	Location: WR-2
			Shelf/Rack: <u>NA</u>
Delivered By:	☒ FedEx	☐ UPS	☐ On Trac
	☐ GSO	☐ DHL	☐ Hand Delivered
Preservation:	☒ Ice	☐ Blue Ice	☐ Dry Ice
	☐ None		
Temp °C: 1.7 (uncorrected)	Probe used: Y / ☒ N		Thermometer ID: <u>IR-4</u>
Temp °C: 1.7 (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	☒	☐	☐
Shipping Custody Seals Intact?	☐	☐	☒
Airbill # <u>1</u> Trk # <u>7769 5238 1957</u>	☒	☐	☐
Shipping Documentation Present?	☒	☐	☐
Shipping Container	☐ Vista	☒ Client	☐ Retain
	☐ Return	☐ Dispose	
Chain of Custody / Sample Documentation Present?	☐	☒	☐
Chain of Custody / Sample Documentation Complete?	☐	☐	☒
Holding Time Acceptable?	☐	☐	☒

Logged In:	Date/Time 11/13/19 0900	Initials: WWS	Location: R-13, WR-2 ↓ ↓ Shelf/Rack: <u>8-3, F-6</u>
COC Anomaly/Sample Acceptance Form completed?			☒ ☒ ☒

Comments:

WWS 11/13/19

Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 1903993

 TAT std

Samples Arrival:	Date/Time <u>11/12/19</u> <u>10:00</u>		Initials: <u>HOG</u>		Location: <u>WR-2</u>		
	Shelf/Rack: <u>NA</u>						
Delivered By:	<u>FedEx</u>	UPS	On Trac	GSO	DHL	Hand Delivered	Other
Preservation:	<u>Ice</u>		Blue Ice		Dry Ice		None
Temp °C: <u>1.9</u> (uncorrected)	Probe used: Y / N			Thermometer ID: <u>IR-7</u>			
Temp °C: <u>1.9</u> (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	☒	☐	☐
Shipping Custody Seals Intact?	☐	☐	☒
Airbill <u>—</u> Trk # <u>7769 5236 6133</u>	☒	☐	☐
Shipping Documentation Present?	☒	☐	☐
Shipping Container <u>Vista</u> Client <u>Retain</u> Return Dispose	☒	☐	☐
Chain of Custody / Sample Documentation Present?	☒	☐	☐
Chain of Custody / Sample Documentation Complete?	☒	☐	☐
Holding Time Acceptable?	☒	☐	☐

Logged In:	Date/Time <u>11/13/19</u> <u>0900</u>	Initials: <u>WWS</u>	Location: <u>R-13, WR-2</u> ↓ ↓	
	Shelf/Rack: <u>A-3, F-6</u>			
COC Anomaly/Sample Acceptance Form completed?			☒	☒

Comments:

CoC/Label Reconciliation Report WO# 1903993

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	Sample BaseMatrix Comments
1	1903993-01 A MW-29		06-Nov-19 11:55	HDPE Bottle, 250 mL	Aqueous
1	1903993-01 B MW-29		06-Nov-19 11:55	HDPE Bottle, 250 mL	Aqueous
1	1903993-02 A MW-30		06-Nov-19 14:25	HDPE Bottle, 250 mL	Aqueous
1	1903993-02 B MW-30		06-Nov-19 14:25	HDPE Bottle, 250 mL	Aqueous
1	1903993-03 A MW-31		06-Nov-19 13:00	HDPE Bottle, 250 mL	Aqueous
1	1903993-03 B MW-31		06-Nov-19 13:00	HDPE Bottle, 250 mL	Aqueous
1	1903993-04 A MW-32		06-Nov-19 13:35	HDPE Bottle, 250 mL	Aqueous
1	1903993-04 B MW-32		06-Nov-19 13:35	HDPE Bottle, 250 mL	Aqueous
2	1903993-05 A MW-33		07-Nov-19 08:55	HDPE Bottle, 250 mL	Aqueous
2	1903993-05 B MW-33		07-Nov-19 08:55	HDPE Bottle, 250 mL	Aqueous
1	1903993-06 A DW-1		06-Nov-19 15:00	HDPE Bottle, 250 mL	Aqueous
1	1903993-06 B DW-1		06-Nov-19 15:00	HDPE Bottle, 250 mL	Aqueous
1	1903993-07 A DW-2		08-Nov-19 09:12	HDPE Bottle, 250 mL	Aqueous
1	1903993-07 B DW-2		08-Nov-19 09:12	HDPE Bottle, 250 mL	Aqueous
1	1903993-08 A DW-3		06-Nov-19 15:30	HDPE Bottle, 250 mL	Aqueous
1	1903993-08 B DW-3		06-Nov-19 15:30	HDPE Bottle, 250 mL	Aqueous
2	1903993-09 A DUP-1		06-Nov-19 00:00	HDPE Bottle, 250 mL	Aqueous
2	1903993-09 B DUP-1		06-Nov-19 00:00	HDPE Bottle, 250 mL	Aqueous
1	1903993-10 A DUP-2		06-Nov-19 00:00	HDPE Bottle, 250 mL	Aqueous
1	1903993-10 B DUP-2		06-Nov-19 00:00	HDPE Bottle, 250 mL	Aqueous
2	1903993-11 A DUP-3		08-Nov-19 00:00	HDPE Bottle, 250 mL	Aqueous
2	1903993-11 B DUP-3		08-Nov-19 00:00	HDPE Bottle, 250 mL	Aqueous
1	1903993-12 A Equip Blank 1		06-Nov-19 16:12	HDPE Bottle, 250 mL	Aqueous
1	1903993-12 B Equip Blank 1		06-Nov-19 16:12	HDPE Bottle, 250 mL	Aqueous
2	1903993-13 A Equip Blank 2		07-Nov-19 15:40	HDPE Bottle, 250 mL	Aqueous
2	1903993-13 B Equip Blank 2		07-Nov-19 15:40	HDPE Bottle, 250 mL	Aqueous
1	1903993-14 A Equip Blank 3		08-Nov-19 14:20	HDPE Bottle, 250 mL	Aqueous
1	1903993-14 B Equip Blank 3		08-Nov-19 14:20	HDPE Bottle, 250 mL	Aqueous
2	1903993-15 A SW-2		08-Nov-19 15:10	HDPE Bottle, 250 mL	Aqueous

2 1903993-15 B SW-2 ☒

1 1903993-16 A SW-3 ☒

1 1903993-16 B SW-3 ☒

2 1903993-17 A OFIN-NW ☒

2 1903993-17 B OFIN-NW ☒

08-Nov-19 15:10 ☒

08-Nov-19 15:30 ☒

08-Nov-19 15:30 ☒

08-Nov-19 14:35 ☒

08-Nov-19 14:35 ☒

HDPE Bottle, 250 mL Aqueous

HDPE Bottle, 250 mL Aqueous

HDPE Bottle, 250 mL Aqueous

HDPE Bottle, 250 mL Aqueous

HDPE Bottle, 250 mL Aqueous

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	☒	☐	☐
Sample Custody Seals Intact?	☐	☐	☒
Adequate Sample Volume?	☒	☐	☐
Container Type Appropriate for Analysis(es)	☒	☐	☐
Preservation Documented: Na2S2O3 Trizma <u>None</u> Other	☐	☒	☒
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	☐	☐	☒

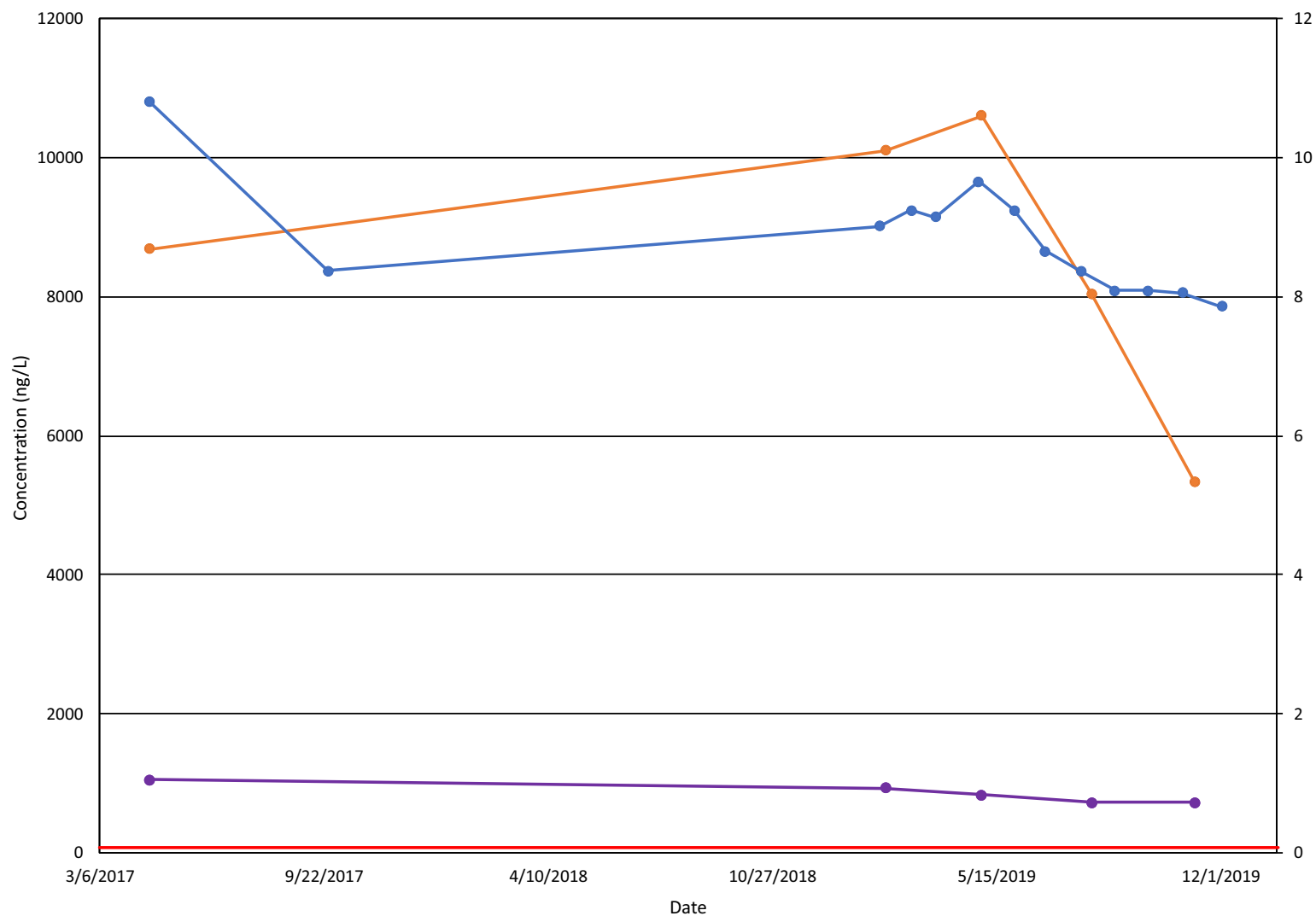
Comments:

1 = cooler 1
2 = cooler 2

Verified by/Date: 11/13/19 *KS*

Appendix D

Groundwater Concentration Trend Plots



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

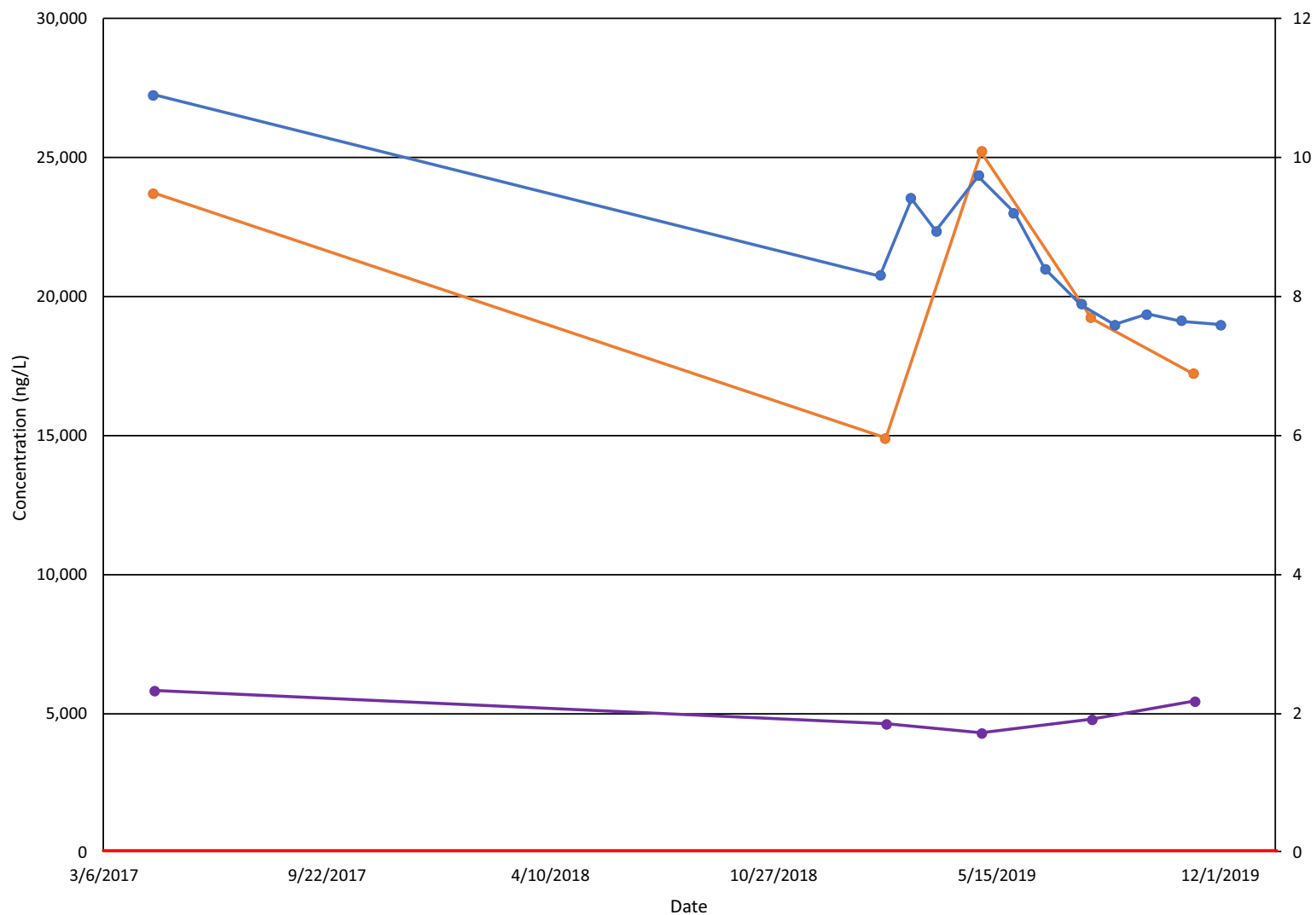
Groundwater Concentration Trend Plot - MW-1

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

 Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1264-06
January 2020	

Figure
D-1



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

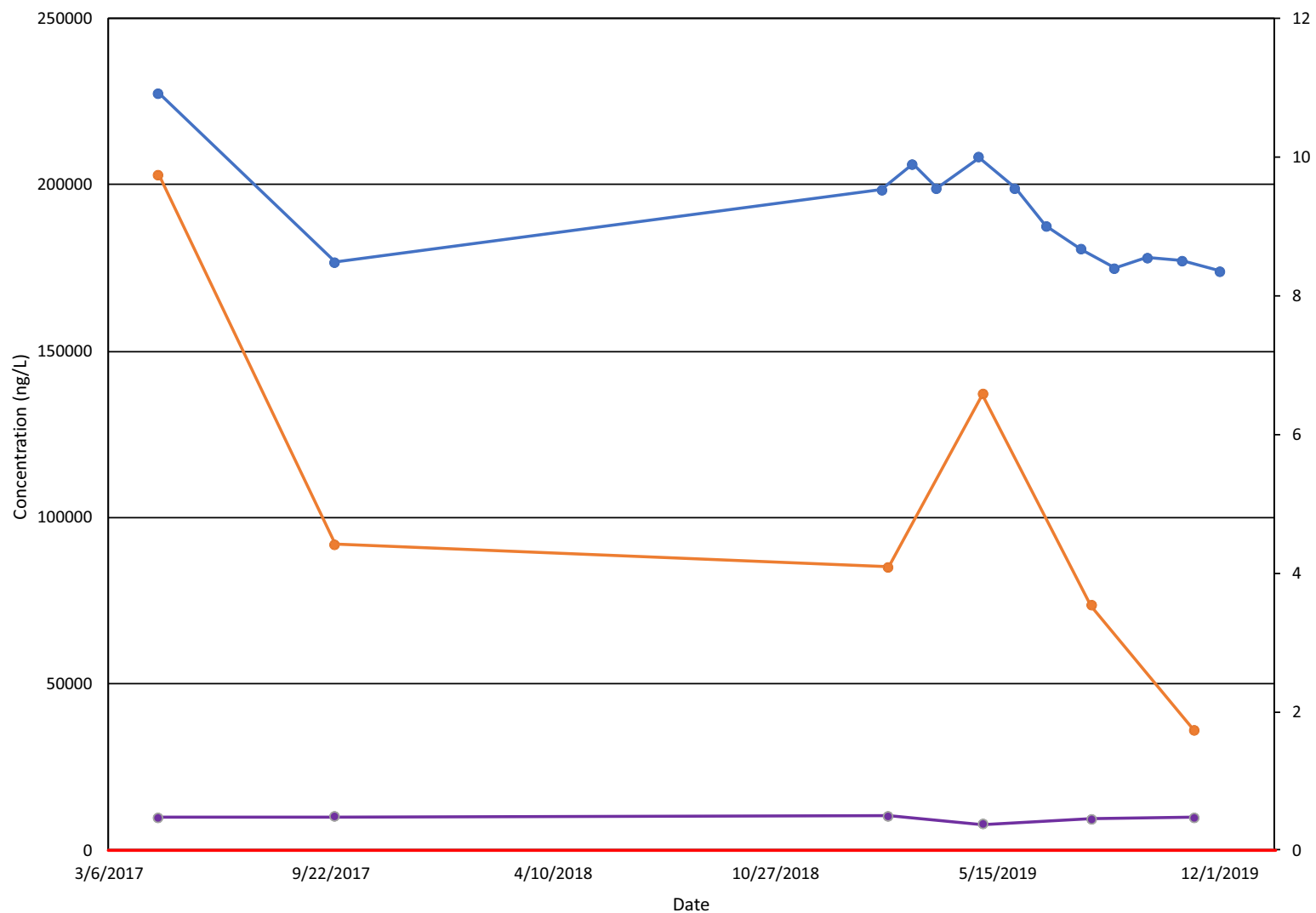
Groundwater Concentration Trend Plot - MW-3

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

APEX Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1264-06
January 2020	

Figure
D-2



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

Groundwater Concentration Trend Plot - MW-4

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon



Apex Companies, LLC
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Portland, Oregon 97201

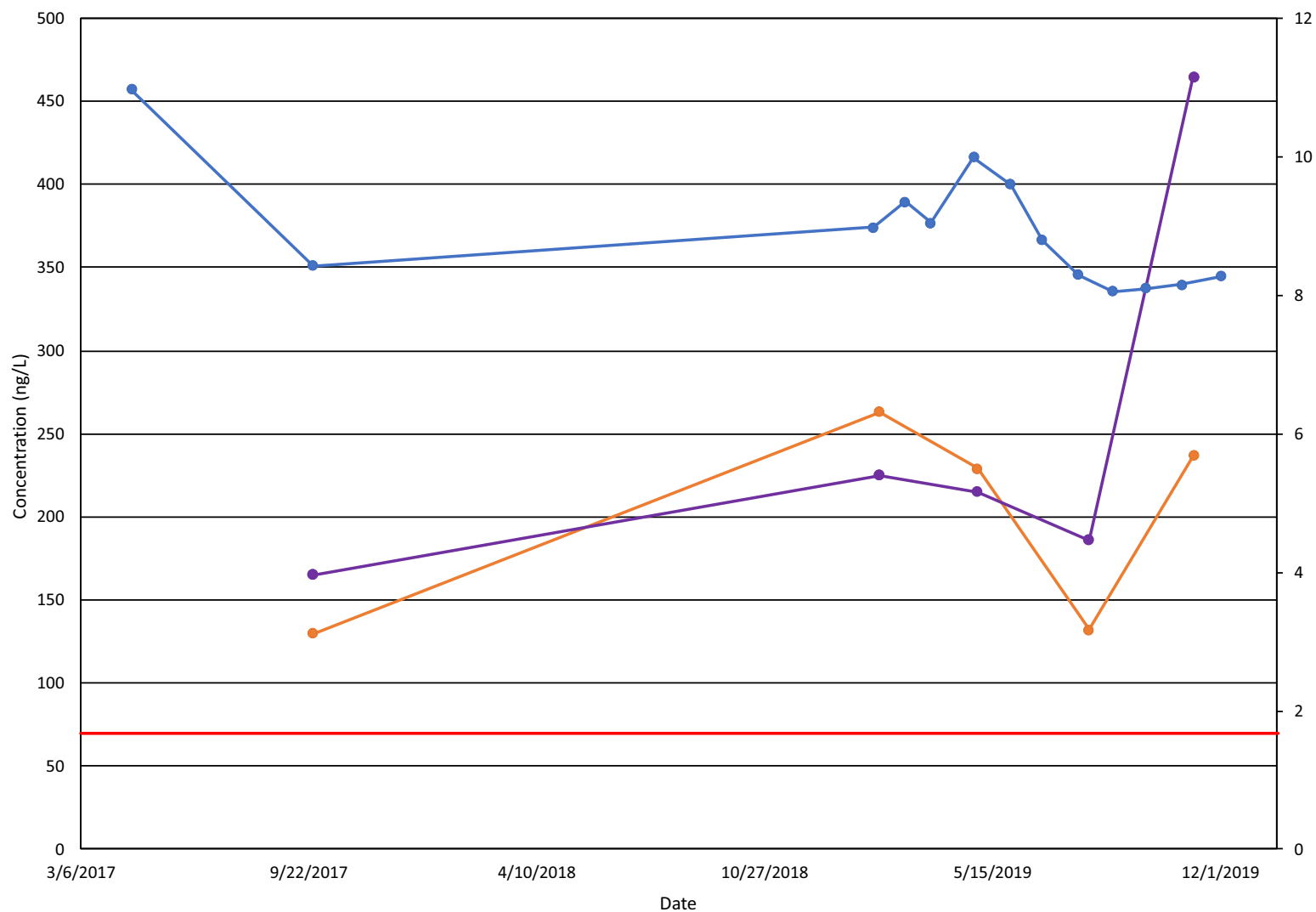
Project Number

1264-06

January 2020

Figure

D-3



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

Groundwater Concentration Trend Plot - MW-8

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Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon



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Portland, Oregon 97201

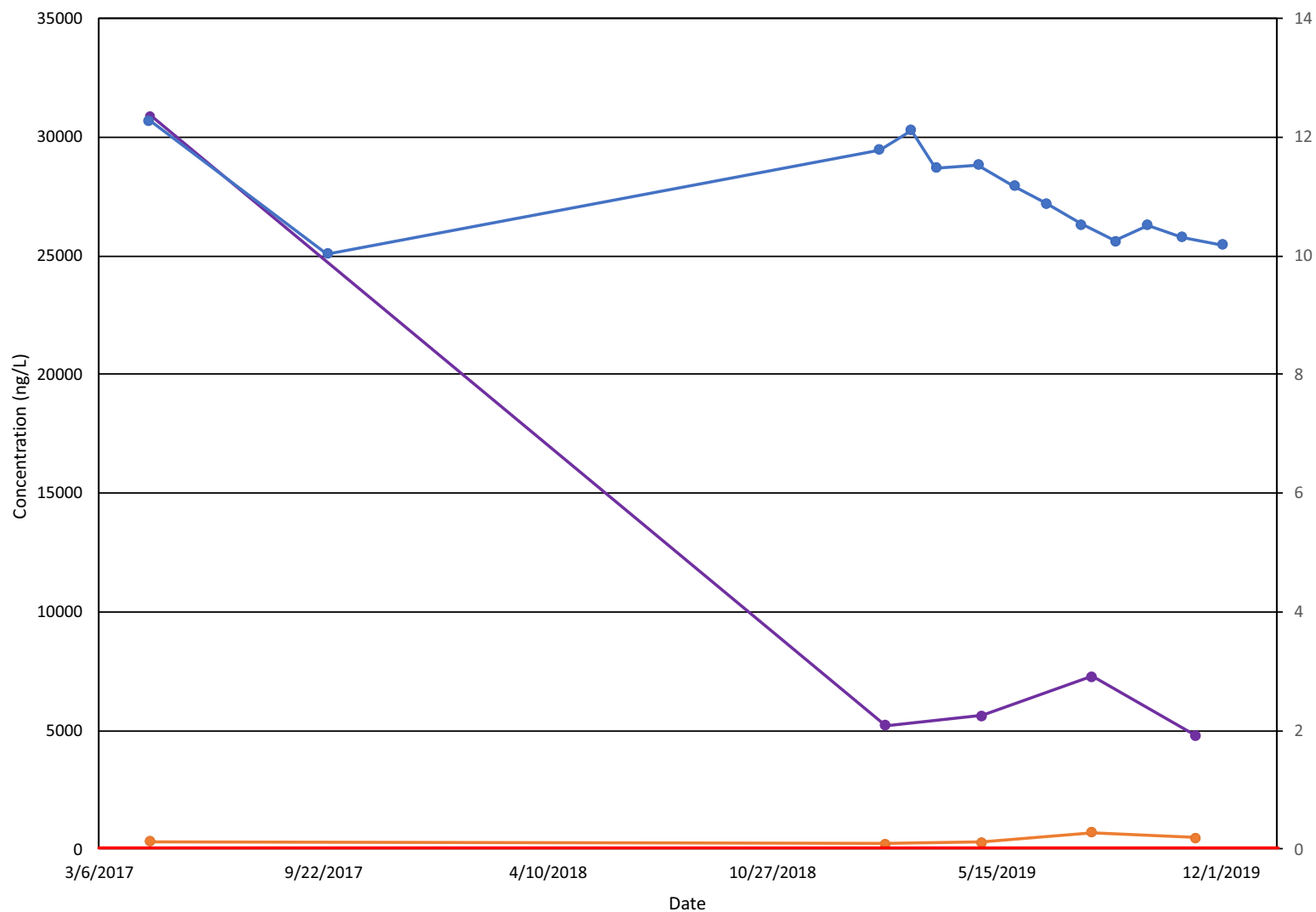
Project Number

1264-06

January 2020

Figure

D-4



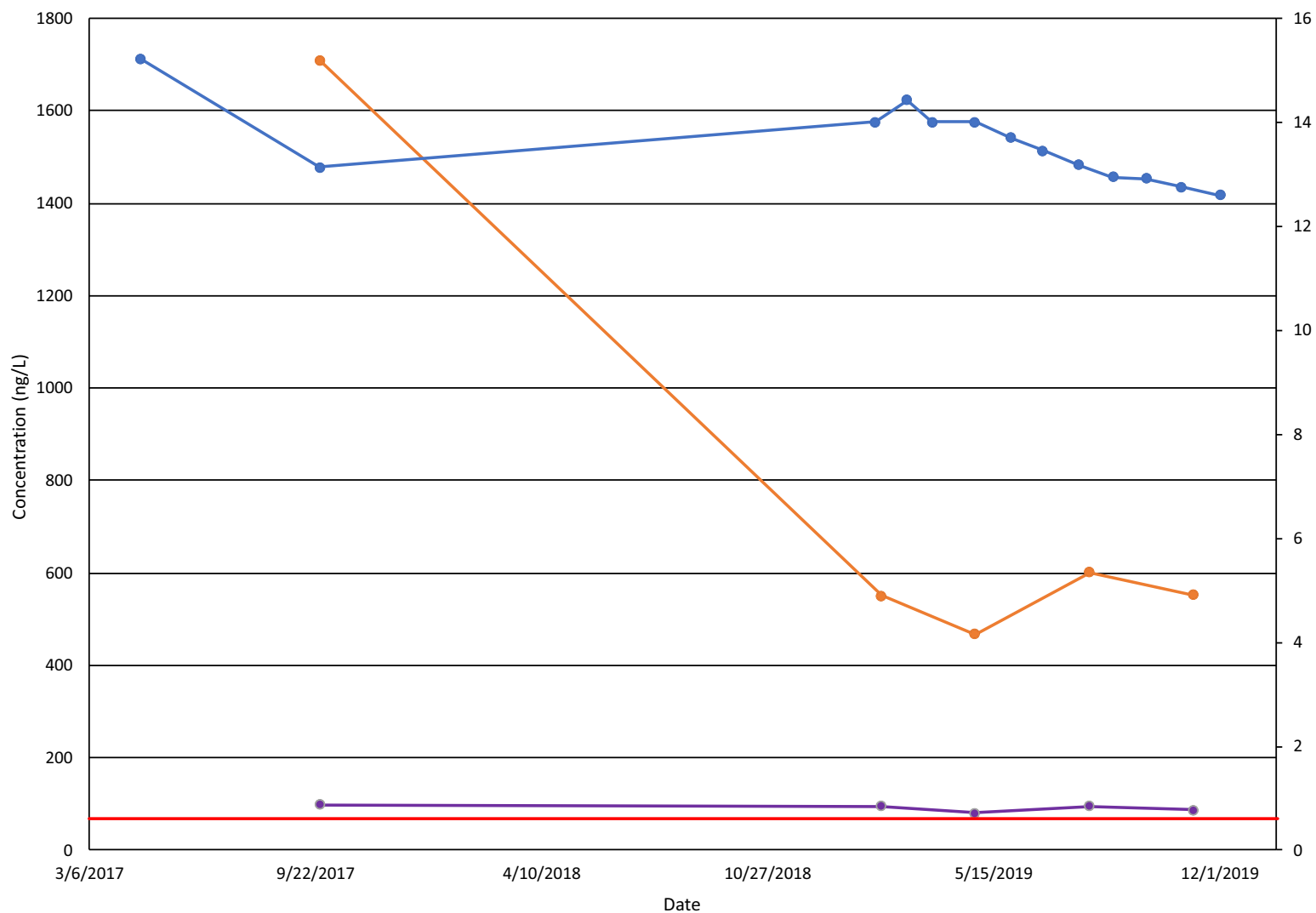
Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

Groundwater Concentration Trend Plot - MW-10A

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

 Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1264-06	Figure
	January 2020		D-5



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

Groundwater Concentration Trend Plot - MW-14

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon



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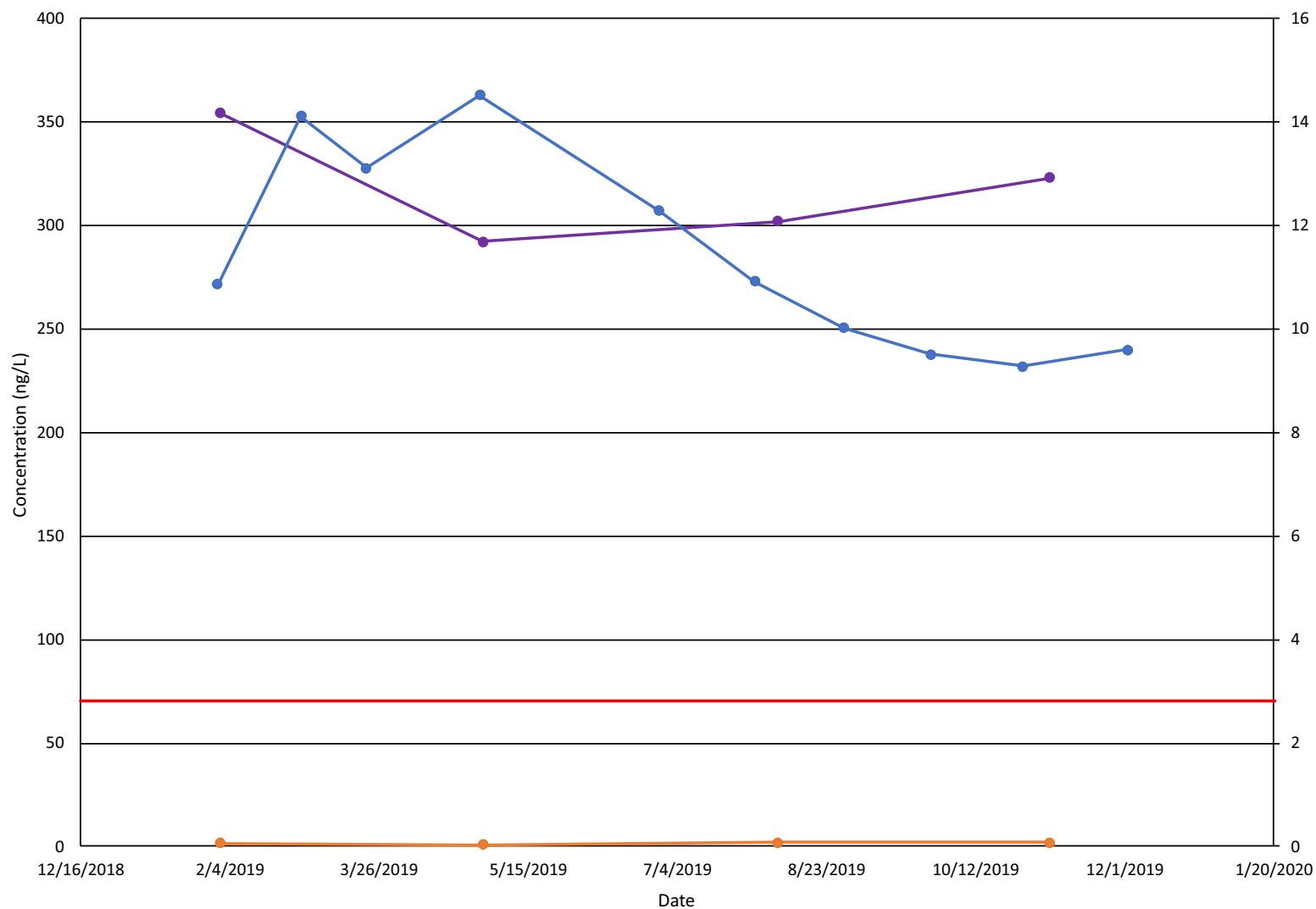
Project Number

1264-06

January 2020

Figure

D-6



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

Groundwater Concentration Trend Plot - MW-26

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon



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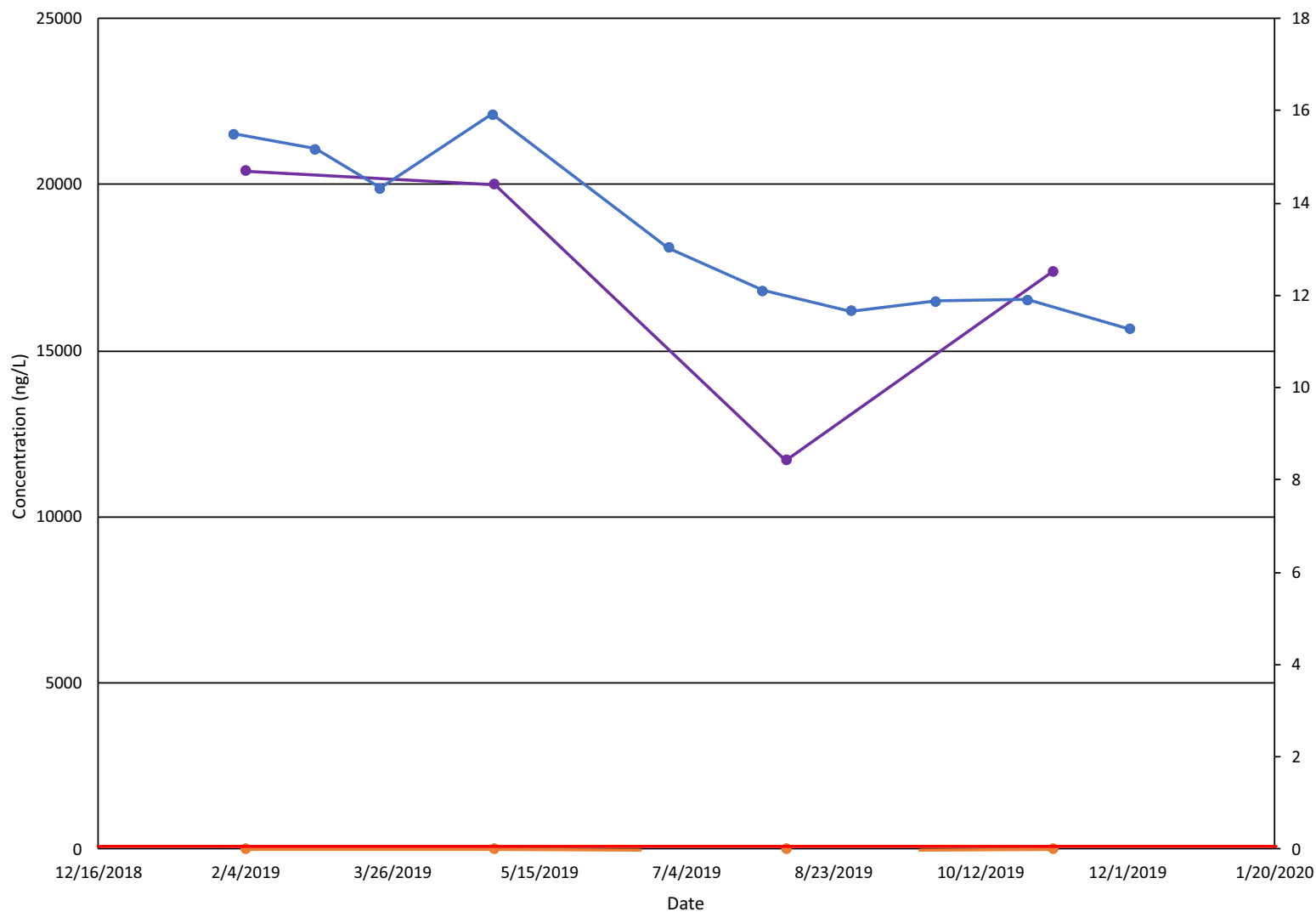
Project Number

1264-06

January 2020

Figure

D-7



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

Groundwater Concentration Trend Plot - MW-28

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon



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Portland, Oregon 97201

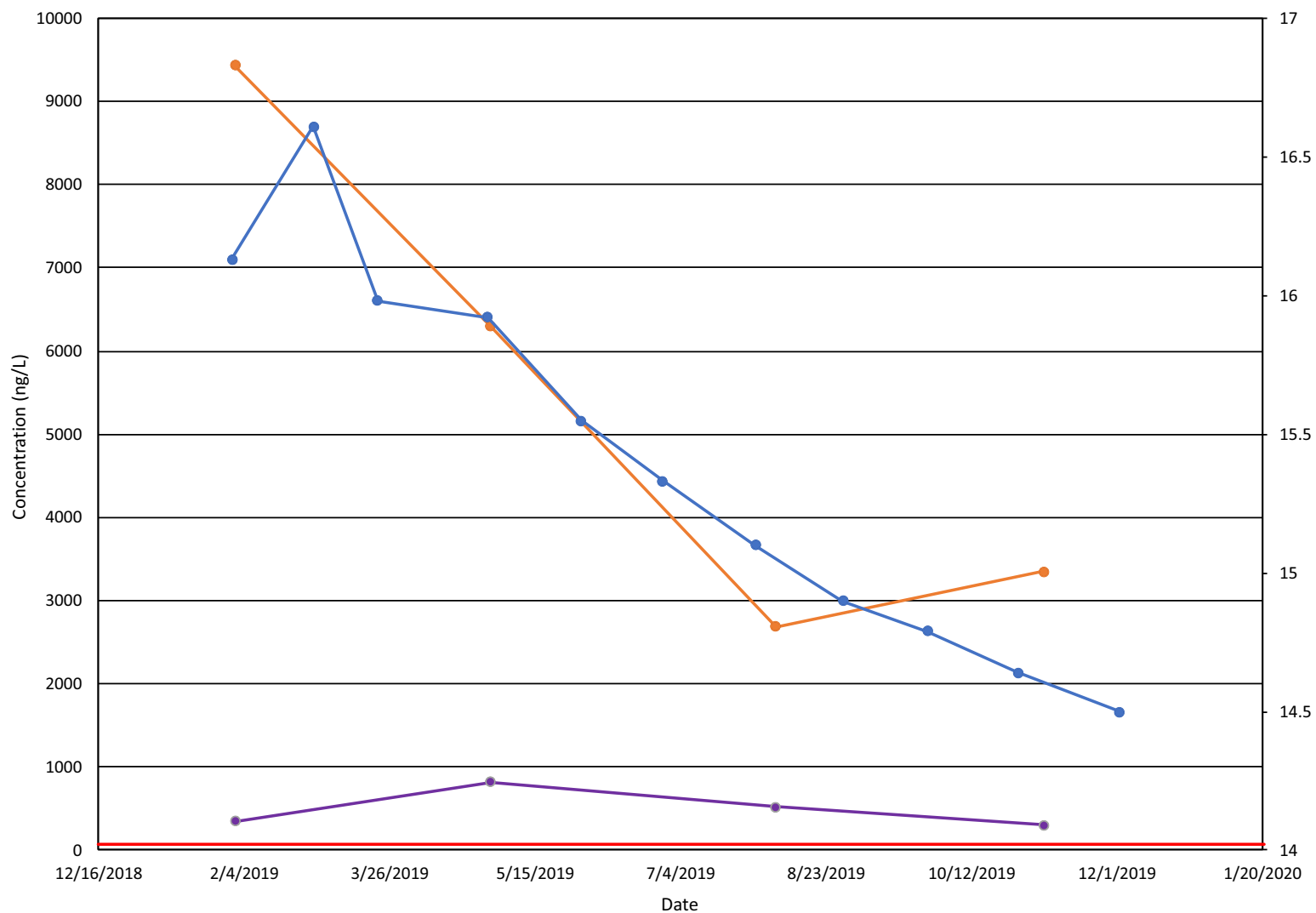
Project Number

1264-06

January 2020

Figure

D-8



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

Groundwater Concentration Trend Plot - MW-29

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon



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Portland, Oregon 97201

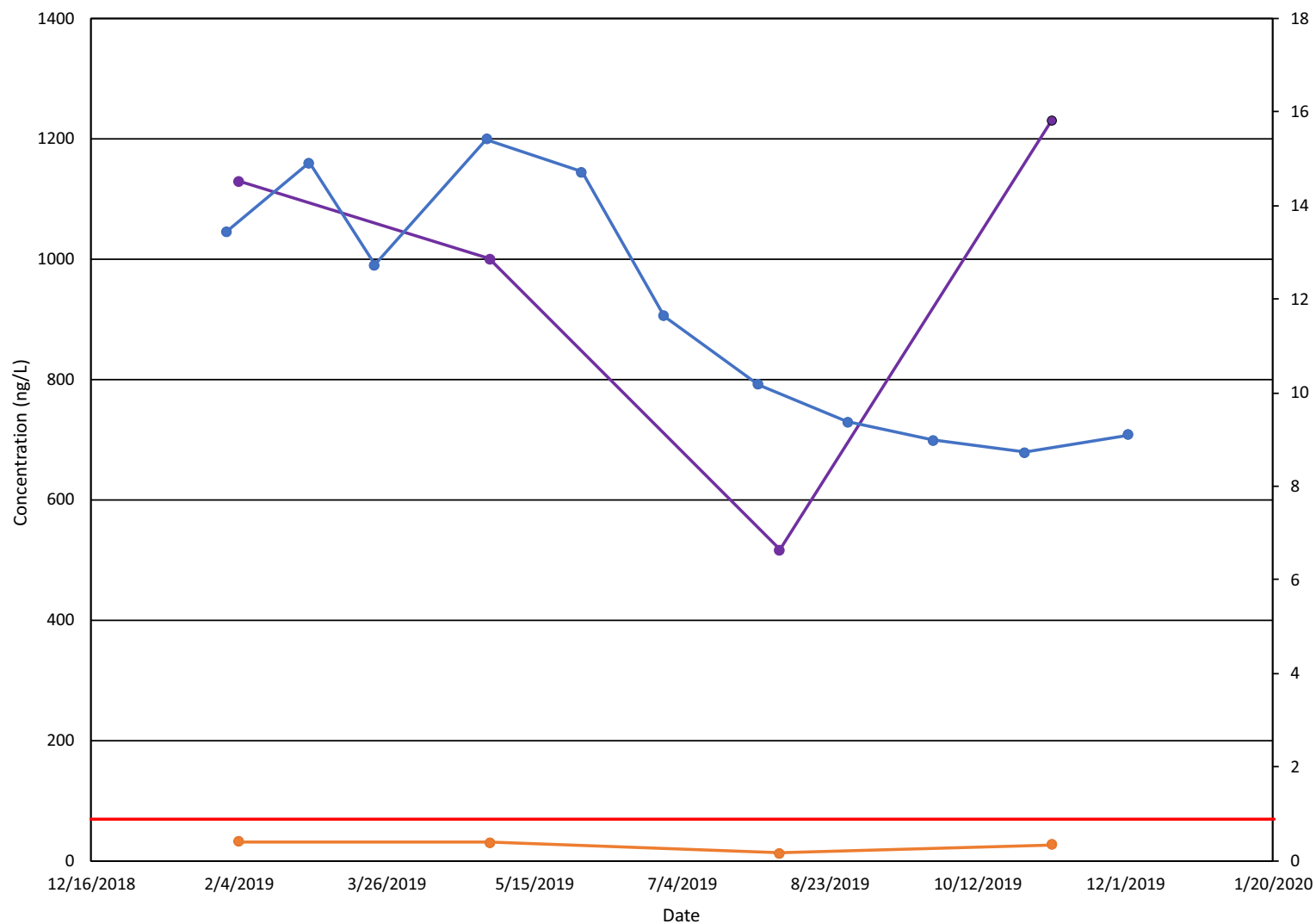
Project Number

1264-06

January 2020

Figure

D-9



Legend:

- PFOS Concentration in ng/L
- PFOA Concentration in ng/L
- EPA Health Advisory Concentration in ng/L
- Groundwater Elevation in Feet Above Mean Sea Level

Groundwater Concentration Trend Plot - MW-31

Fourth Quarter 2019 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon



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Project Number

1264-06

January 2020

Figure

D-10