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March 14, 2019

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Subject: Final Phase 2 PFAS Site Investigation Report

Fresno Air National Guard Base, Fresno, California

Contract No. W9133L-14-D-0001, TO 0007 AECOM Project Number: 60520893

Dear Greg,

Please find a copy of the Final Site Investigation Report for the above referenced installation. Please contact me at (301) 820-3246 or via e-mail (<u>mike.myers@aecom.com</u>) if you have any questions or comments.

Yours Sincerely,

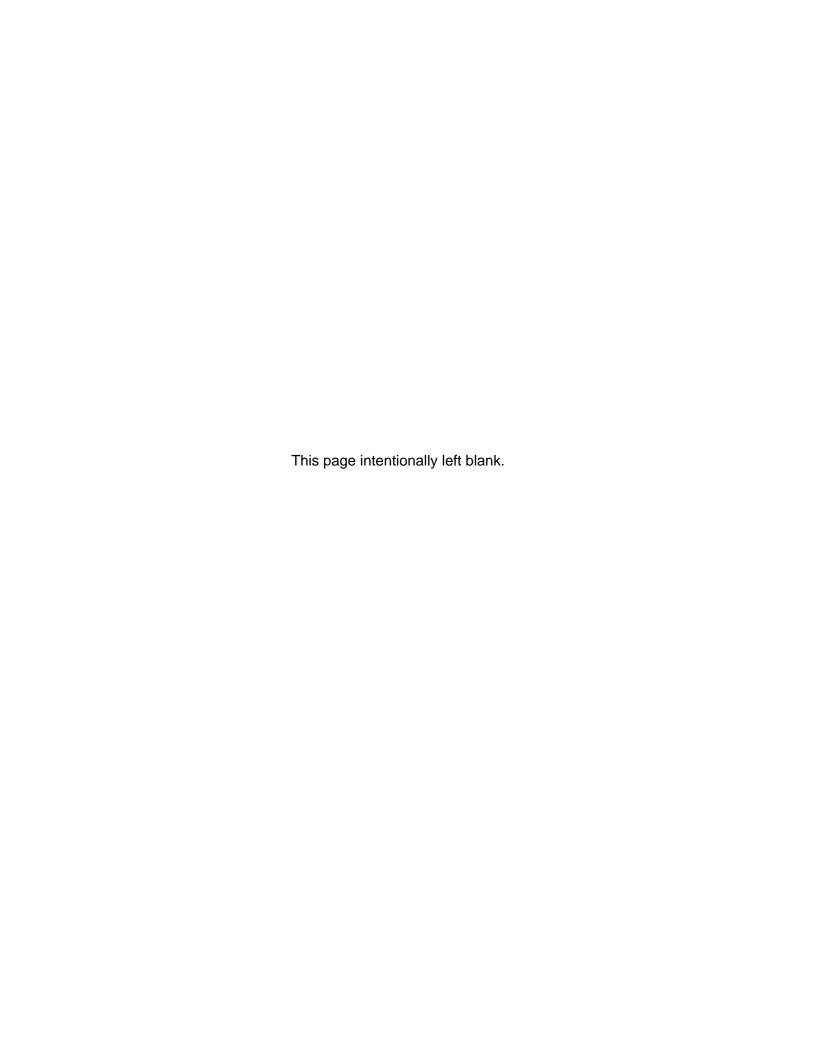
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# Final Site Inspection Report Air National Guard Phase II Regional Site Inspections for Perand Polyfluoroalkyl Substances

Fresno Air National Guard Base Fresno, California

NGB/A4OR

Contract No. W9133L-14-D-0001, Task Order No. 0007

March 2019

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# **List of Acronyms and Abbreviations**

AFFF aqueous film-forming foam
amsl above mean sea level
ANG Air National Guard
ANGB Air National Guard Base
ARFF aircraft rescue and firefighting

BB&E BB&E, Inc.

bgs below ground surface btoc below top of casing

COPC chemical of potential concern

CSM conceptual site model

DQO data quality objective
DOD Department of Defense

EM Environmental Manager

ESAM Environmental Sampling and Monitoring Plan

ESS environmental sequence stratigraphy

FSS fire suppression system

ft foot or feet
FTA Fire Training Area
FW Fighter Wing

HA Health Advisory
HEF high expansion foam
HSA hollow stem auger

IAP international airport

IDW investigation-derived waste IRP Installation Restoration Program

LOD limit of detection LOQ level of quantitation

MS matrix spike

MSD matrix spike duplicate

NA Not Applicable NFA no further action

NGB/A4OR National Guard Bureau, Operations Division, Restoration Branch

ng/g nanograms per gram ng/L nanograms per liter

NOAA National Oceanic and Atmospheric Administration

OWS oil/water separator

PA Preliminary Assessment PAL project action levels

PFAS per- and polyfluoroalkyl substances

PFBS Perfluorobutanesulfonate
PFC Perfluorinated compounds

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PFHpA Perfluoroheptanoic acid
PFHxS Perfluorohexanesulfonate
PFNA Perfluorononanoic acid
PFOA Perfluorooctanoic acid
PFOS Perfluoro-octanesulfonate
PID photoionization detector

ppm parts per million

PRL potential release location

ppt parts per trillion

QC Quality Control

RI Remedial Investigation RSL Regional Screening Levels

RWQCB Regional Water Quality Control Board

SI Site Inspection

SOP standard operating procedure

THQ Target Hazard Quotient

UCMR-3 Unregulated Contaminant Monitoring Rule

US United States

USAF United States Air Force

US EPA United States Environmental Protection Agency

USGS United States Geological Survey

VOC Volatile Organic Compound

WP work plan

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# **Executive Summary**

Under contract to the National Guard Bureau, Operations Division, Restoration Branch (NGB/A4OR), AECOM conducted a basewide Comprehensive Environmental Response, Compensation, and Liability Act Site Inspection (SI) for per- and polyfluoroalkyl substances (PFAS) at the Fresno Air National Guard Base (ANGB) (base), 144th Fighter Wing, Fresno County, Fresno, California. The objectives for the SI are: (1) determine the presence or absence of PFAS in soil, surface water or sediment at nine potential release locations (PRLs) and in groundwater immediately downgradient of each sampled PRL, (2) assess if PFAS from the base are migrating off-base, and (3) determine if the concentrations of PFAS at each PRL are present in quantities or concentrations that warrant no further action or additional investigation as part of the Expanded SI or Remedial Investigation / Feasibility Study phase, and if so, what the appropriate data quality objectives (DQOs) should be.

PFAS are not currently regulated at the federal level, and are not regulated in soil or groundwater by the State of California; however, the Regional Water Quality Control Board (RWQCB) implemented a notification level for water supply wells. The notification level for Perfluoro-octanesulfonate (PFOS) is 13 parts per trillion (ppt) and Perfluorooctanoic acid (PFOA) is 14 ppt (Division of Drinking Water, 2018). The United States Environmental Protection Agency (US EPA) has established lifetime health advisory (HA) levels for PFOS and PFOA. The HAs were established to protect against potential risk from exposure to these compounds via drinking water; a US EPA tapwater regional screening level (RSL) has been established for Perfluorobutanesulfonate (PFBS). US EPA residential soil RSLs were calculated for PFOS, PFOA, and PFBS to address direct contact with soils. These values were considered in establishing project action levels (PALs) that are provided in Appendix C, Laboratory Quality Assurance Project Plan in the Final SI Work Plan (WP) (AECOM, 2018). There are no PALs for Perfluoroheptanoic acid (PFHpA), Perfluorohexanesulfonate (PFHxS), and Perfluorononanoic acid (PFNA).

PALs for PFOS, PFOA, and PFBS include:

- Groundwater:
  - PFOS and PFOA: A PAL of 70 nanograms per liter (ng/L) was selected for PFOS and PFOA; it is the US EPA drinking water HA level for screening the individual and combined (PFOS + PFOA) groundwater concentrations (USEPA, 2016a,b,c).
  - <u>PFBS</u>: A PAL of 400,000 ng/L was selected for PFBS; it is the May 2018 US EPA generic tapwater RSL that was derived using a target hazard quotient (THQ) equal to 1.0 and is protective of a residential receptor drinking the water (US EPA, 2018).
- Soil:
- O PFOS and PFOA: PALs of 1,260 nanograms per gram (ng/g) for both PFOS and PFOA were conservatively calculated using the US EPA RSL calculator (May 2018 version). The calculated PALs were derived using a THQ equal to 1.0 and are protective of a residential receptor coming into direct contact with soil (i.e., incidental ingestion of soil, dermal contact and outdoor inhalation of particulates) (US EPA, 2018).
- PFBS: A PAL of 1.26 x 10<sup>6</sup> ng/g for PFBS was conservatively calculated using the US EPA RSL calculator (May 2018 version). The calculated PAL was derived using a THQ equal to 1.0 and is protective of a residential receptor coming into direct contact with soil (i.e., incidental ingestion of soil, dermal contact and outdoor inhalation of particulates) (US EPA, 2018). US EPA does provide a generic residential direct contact soil RSL of 1.30 x 10<sup>6</sup> ng/g dated May 2018 (US EPA 2018). However, the Air National Guard (ANG) bases around the country have chosen to use the more stringent, calculated RSL for screening PFBS.

PALs were not specifically defined for surface water and sediment in the SI WP (AECOM, 2018), for purposes of this SI Report, they are defined as follows:

- Surface Water: There are no surface water specific screening criteria due to the absence of state
  or federal guidance levels; therefore, surface water PALs are equivalent to groundwater PALs,
  defined above.
- Sediment: There are no sediment specific screening criteria due to the absence of state or federal guidance levels; therefore, sediment PALs are equivalent to the soil PALs, defined above.

Nine PRLs at Fresno ANGB were selected for SI activities based on a Preliminary Assessment (PA) site visit conducted in January 2016. The results of the PA site visit were documented in the *Final Perfluorinated Compounds Preliminary Assessment Site Visit Report* (BB&E, Inc. [BB&E], 2016). The PA Report identified nine PRLs, all of which were recommended for further investigation.

The SI field activities were completed from May 2018 to June 2018, culminating in the collection of 38 soil samples, six groundwater samples, and three sediment samples. Due to the lack of any rain in May and June 2018, surface water was not present during field activities, therefore the surface water could not be sampled at PRLs 7, 8, and 9 (Stormwater Discharge Point 01, 04, and 06, respectively) per the WP (National Oceanic and Atmospheric Administration [NOAA], 2018). Additionally sediment was not sampled at Stormwater Discharge Point 06 (PRL 9) because sediment was not present.

Collected samples were analyzed for six PFAS consistent with the US EPA third Unregulated Contaminant Monitoring Rule (UCMR-3) (US EPA, 2012). One new monitoring well (100-MW01) installed at the southern boundary was used to evaluate off-base migration. One new monitoring well was attempted but not installed (APR-MW01, PRL 8) after mounded groundwater was encountered, likely attributable to a leaking, underground pipeline in the area that had been capped but not drained. The mounded groundwater appears to have changed the expected groundwater flow direction from the southwest to the northwest, though this gradient is likely transient. Three existing base boundary wells intended for sampling to monitor off-base migration could not be located during a site walk with the base Environmental Manager (EM). A summary of the maximum sampling results exceeding PALs for each PRL is provided in **Table ES-1**.

Table ES-1. Summary of SI Maximum Sampling Results Exceeding PALs

PRL			Result Exceeding PAL <sup>a,b,c</sup>			
Number	PRL Name	Media	PFOS	PFOA	PFBS	
1	Former Fire Training Area	Soil	None above the PALs			
'		Groundwater		170 ng/L		
2	Aircraft Parking Ramp	Soil	None above the PALs			
		Groundwater	NS			
	Building 145 (Fire Station)	Soil	No	None above the PALs		
3		Groundwater	Combined total was not			
			above the PAL.		1	
4	Building 100 (Aircraft Hangar)	Soil	None above the PALs		.S	
4		Groundwater		130 ng/L	1	
5	Duilding 157 (Fuel Cell)	Soil	None above the PALs			
5	Building 157 (Fuel Cell)	Groundwater	NS			
6	Building 104 (Former Fire	Soil	2,000 ng/g			
0	Department)	Groundwater		130 ng/L		
7	Starmwater Discharge Daint 01	Sediment	Nor	ne above the PAL	.S	
/	Stormwater Discharge Point 01	Surface Water	NS			
8	Stormwater Discharge Point 04	Sediment	None above the PALs			
<u> </u>		Surface Water	NS		·	
9	Stormwater Discharge Boint 06	Sediment	NS			
9	Stormwater Discharge Point 06	Surface Water	NS			
NA	Base Boundary Wells <sup>d</sup>	Groundwater		130 ng/L		

Table ES-1 lists the compounds that exceed the following PALs. Compounds without PALs are included in Tables in Section 5.

	Groundwater and Surface Water	Soil and Sediment
Compound	(ng/L)	(ng/g)
PFOS	70	1,260
PFOA	70	1,260
PFOS + PFOA	70	Not applicable
PFBS	400,000	1.26 x 10 <sup>6</sup>

(a) US EPA, 2016a. Drinking Water Health Advisory for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. US EPA Document Number: 822-R-16-004. May 2016.

(b) US EPA, 2016b. Drinking Water Health Advisory for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. US EPA Document Number: 822-R-16-005. May 2016.

(c) US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.

(d) Regional groundwater flow is southwesterly, but local groundwater flow during the SI was to the northwest

-- indicates compound was not detected above the PAL ng/g = nanograms per gram ng/L = nanograms per liter NA = Not applicable NS = Not sampled

PAL = project action level

PFBS = Perfluorobutanesulfonate PFOA = Perfluorooctanoic acid PFOS = Perfluoro-octanesulfonate PRL = potential release location THQ = target hazard quotient

PFAS were present in all media sampled at each sampled PRL. Three PRLs (PRL 1, 4, and 6) had levels of PFAS that exceeded the PALs in groundwater with the highest value recorded at the Former Fire Training Area (PRL 1). The only detection of PFAS in soil above the PAL was at Building 104 Former Fire Department (PRL 6). PFAS were detected at concentrations that exceeded PALs at the northwestern and southern base boundary wells and could be migrating off-base, with a groundwater flow direction to the southwest or to the northwest.

PFAS were detected in the sediment samples from Stormwater Discharge Points 01 and 04 (PRLs 7 and 8). A co-located surface water sample could not be collected during the SI for any stormwater discharge point, and Stormwater Discharge Point 06 (PRL 9) did not contain sediment or surface water to sample. Stormwater Discharge Point 01 (PRL 7) is an on-base outfall, whereas Stormwater Discharge Point 04 (PRL 8) is located along the southern property boundary.

The following recommendations are provided for consideration based on the SI results:

- Further investigation at all nine PRLs is necessary to determine the nature and extent of PFAS
  contamination due to detectable levels at eight sampled PRLs, and one PRL that could not be
  sampled during the SI field activities.
- Expand the conceptual site model (CSM) to consider localized groundwater and surface water flow paths to select future sampling locations. To refine the CSM for Fresno ANGB, an environmental sequence stratigraphy (ESS) analysis could be performed to generate new cross sections. This information could:
  - Identify and map (the composition, shape, and interconnectivity of) potentially undefined fluvial channels and other geologic features at the plume scale.
  - Construct a geologically defensible framework of the subsurface that better defines subsurface heterogeneity, accurately predicts preferential pathways, and reduces data gaps.
  - Achieve a greater understanding of groundwater and dissolved contaminant flow preferential pathways and thus target areas for active remedial implementation.
  - Reduce the number of future wells for plume measurements through stratigraphic quidance.
- Complete the delineation as part of an Expanded SI or a Remedial Investigation that could consist of:
  - Expanding the monitoring well network and groundwater sampling program to complete horizontal and vertical delineation of the PFAS impacts. Further groundwater evaluation is recommended at the base boundary and at all PRLs with groundwater detections.
  - Installing and sampling downgradient monitoring wells to better define the impacts of PFAS that have migrated off-base, and installation of upgradient monitoring wells to better define the impacts of PFAS that may have migrated on-base (from off-base sources).
  - Performing additional soil sampling and analysis of an expanded list of PFAS (in addition to the six UCMR-3 compounds) and precursor analytes to determine if significant source areas related to precursor substances are present. Precursor substances have been demonstrated to oxidize into PFOS and PFOA via biological and abiotic processes and thus could provide a lingering source of PFOS and PFOA in soil and groundwater.
  - Resample existing and newly installed groundwater wells once baseline groundwater flow directions are attained as based on gauging data.
  - Conducting additional sediment and surface water sampling in the Stormwater Discharge Points (PRLs 7, 8, and 9) during the winter months to address data gaps from the dry southern base boundary wells along the southern border and stormwater discharge points during the SI field work.

- Sampling the soils throughout the vadose zone from approximately 5 feet below ground surface (ft bgs) through the groundwater depth, that averaged 113 ft bgs during the SI field activities.
- Conduct preliminary site-specific risk assessment calculations in order to identify chemicals of potential concern in every media and establish preliminary remedial goals for screening.

DQOs are proposed based on the results of the SI and are presented in **Section 6.5.3.** A summary of these DQOs are presented in **Table ES-2**. Additional sampling and analysis is required at each PRL not achieving a no further action status to establish the nature and extent of PFAS for each applicable media and determine if there is a complete receptor pathway. For soil, additional sampling and analysis is required to determine if a source area exists and if so, the vertical and horizontal extent for both the vadose and saturated zones.

Table ES-2. Relevant Data Quality Objectives

PRL No.	PRL Description	Compounds Exceeding PALs	Sampling Recommendation(s) and Objectives	
1	Former Fire Training Area	Groundwater: PFOA	Soil: Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to	
2	Aircraft Parking Ramp	Groundwater: PFOA	determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration.  Groundwater: Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells	
3	Building 145 (Fire Station)	None	Soil: Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration.  Groundwater: Although PALs were not exceeded, PFAS were detected in collected groundwater samples. Therefore, additional groundwater sampling is proposed to better define potential groundwater impacts both vertically and horizontally through the sampling of existing and additional new monitoring wells	
4	Building 100 (Aircraft Hangar)	Surface Soil: PFOS Groundwater: PFOA	Soil: Additional surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the reported use of the AFFF-containing fire suppression system (FSS), documented AFFF leaks, and suspicion of an accidental release.  Groundwater: Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells	
5	Building 157 (Fuel Cell)	None	Soil: Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration.  Groundwater: Although PALs were not exceeded, PFAS were detected in collected groundwater samples. Therefore, additional groundwater sampling is proposed to better define potential groundwater impacts both vertically and horizontally through the sampling of existing and additional new monitoring wells	
6	Building 104 (Former Fire Department)	Surface Soil: PFOS Groundwater: PFOA	Soil: Additional surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the potential for a fire department to have soil impacts in a spatial direction.  Groundwater: Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells	
7	Stormwater Discharge Point 01	None	Surface Water and Sediment: Conduct sampling of surface water to determine if there is a complete pathway from these PRLs to the base outfalls. Conduct	
8	Stormwater Discharge Point 04	None	additional sediment sampling in associated surface water runoff drainage feature.	
9	Stormwater Discharge Point 06	NA	Surface Water and Sediment: Conduct sampling of surface water to determine if there is a complete exposure pathway from this PRL to the base outfalls. Conduct sediment sampling in associated surface water runoff drainage features.	
General			Groundwater: (1) Collect additional groundwater samples in upgradient locations to quantify potential impacts from upgradient sources; and (2) Collect additional groundwater samples off-base from a limited number of new monitoring wells to determine if PFAS impacts beyond the base boundary are increasing or decreasing.	
Notes:				

NA = Not Applicable, samples unable to be collected.

### 1. Introduction

Under contract to National Guard Bureau, Operations Division, Restoration Branch (NGB/A4OR), AECOM has prepared this Site Inspection (SI) Report to document the per- and polyfluoroalkyl substances (PFAS) focused field activities at nine potential release locations (PRLs) and the base boundary wells identified by the Air National Guard (ANG) on Fresno Air National Guard Base (ANGB), 144th Fighter Wing, Fresno County, Fresno, California (BB&E, Inc. [BB&E], 2016). **Figure 1-1**, located in **Appendix A**, provides a general location map for Fresno ANGB.

The SI, which follows the Preliminary Assessment (PA) in the Comprehensive Environmental Response, Compensation, and Liability Act process, is not intended as a full-scale study of the nature and extent of contamination. The United States Environmental Protection Agency (US EPA) identifies the SI as the onsite inspection to determine what hazardous substances are present and if they are being released to the environment. Its purpose is to augment the data collected in the PA and to generate, if necessary, sampling and other field data to determine if an Expanded SI or remedial investigation (RI) is appropriate.

A detailed description of the field procedures and scope of work intended to be performed during this SI is included in the Final SI Work Plan (WP) (AECOM, 2018). Field activities for the SI were conducted between May 2018 and June 2018. This SI Report presents the analytical results of the groundwater, soil, and sediment sampling. Finally, it provides conclusions and recommendations based on the results of the SI.

### 1.1 PFAS Overview

Perfluorinated compounds (PFCs), which are more recently referred to as PFAS, comprise a diverse group of synthetic chemicals used for over 50 years in various military and industrial applications and consumer products. The term "PFAS" is used hereafter throughout the SI report when referring to "PFCs". PFAS are detected in aqueous film-forming foams (AFFF) used for firefighting and fire suppression systems (FSS) starting in the 1970s; however, it was introduced to some bases prior to 1970. Sources of PFAS used by military and commercial airports can include: firefighting training areas, nozzle test areas, hangars and other buildings equipped with fire suppression equipment, fire stations, AFFF loading, handling and storage areas, aircraft and vehicle crash response areas, and AFFF ponds, sumps, tanks, landfills and/or other areas of disposal. The United States Air Force (USAF) estimates PFAS-containing AFFF may have been used at approximately 200 active and former USAF bases, including ANG and USAF Reserve facilities.

Properties of some PFAS that were analyzed for in this SI include:

- Limited sorption to soil and sediments
- Highly water soluble, non-volatile and extremely mobile in water
- Exceptional stability
- Persistent with very little attenuation
- Widely present in the environment, bioaccumulative, and detected in plants, animals, and humans

Potential health effects are based on toxicological data that is generally limited for most PFAS with the exception of a few more highly studied compounds. The C8 Science Panel identified the following probable links to Perfluorooctanoic acid (PFOA) exposures (C8 Science Panel, 2018):

- Ulcerative colitis
- Thyroid disease
- Testicular and kidney cancer
- Pregnancy-induced hypertension
- Diagnosed high cholesterol

Concerns associated with PFAS prompted the US EPA to include six PFAS in its third Unregulated Contaminant Monitoring Rule (UCMR-3) requiring sampling for PFAS in many large public water systems (US EPA, 2012). This sampling resulted in the discovery of impacted drinking water supplies; several linked to Department of Defense (DOD) and commercial airport sites. The US EPA finalized its lifetime health advisory (HA) levels in 2016 for Perfluoro-octanesulfonate (PFOS) and PFOA in drinking water at 70 nanograms per liter (ng/L) with a recommendation for combined PFOS/PFOA concentrations less than 70 ng/L (US EPA, 2016a,b). Given these impacts to drinking water sources and the establishment of US EPA HA levels, increased environmental regulatory scrutiny is occurring and is expected to continue.

The state of California implemented Notification Levels for detections of PFOS and PFOA in water supply wells of 13 parts per trillion (ppt) and 14 ppt, respectively (DDW, 2018). Wells on the Fresno ANG are not water supply wells; therefore, the EPA HA for groundwater was selected as the most relevant PAL

### 1.2 Scope and Objectives

The objectives for the SI are: (1) determine the presence or absence of PFAS in soil, surface water or sediment (if present) at nine PRLs and in groundwater immediately downgradient of each PRL, and (2) assess if PFAS from the base are migrating off-base, and (3) determine if the concentrations of PFAS at each PRL are present in quantities or concentrations that warrant no further action (NFA) or additional investigation as part of the Expanded SI or RI / Feasibility Study phase, and if so, what the appropriate data quality objectives (DQOs) should be. The scope of work included the completion of soil borings and groundwater monitoring wells, and the collection of soil and groundwater samples, and sediment and surface water samples (if present) to evaluate the presence or absence of SI chemicals of potential concern (COPCs).

### 1.3 Report Organization

This SI Report is organized into the following eight sections:

- Section 1, Introduction
- Section 2, Base Description
- Section 3, Environmental Setting
- Section 4, Investigation Activities
- Section 5, Site Inspection Results
- Section 6, Analysis of Results
- Section 7, Conclusions and Recommendations
- Section 8, References

# 2. Base Description

### 2.1 Site History

In 1955, the ANG's144th Fighter Wing (FW) was relocated to the Fresno-Yosemite International Airport (IAP). The 144th FW leased approximately 111 acres of land from the Fresno-Yosemite IAP in three parcels (Parcels A, B, & 2). Additionally, a fourth parcel, parcel 1, was leased from the IAP from November 1, 1954 through 2012. Upon expiration of the lease in 2012 the parcel was returned to the IAP. All of the AFFF was used and stored on Parcel A (BB&E, 2016). At the time of relocation, the 144th FW was flying its first jet aircraft, the F-86A. In 1958 the transition was made to the F-86L, which was flown for approximately eight years. The 144th brought the F-106 into service until 1983, upon which time the F-4D became the Wing's new aircraft (Fresno ANGB, 2018).

In 1989 the 144th FW began a new era by completing the transition to air defense version of the F-15A Fighting Falcon, and the Wing has flown newer iterations of the F-15 ever since. The FW maintains a fleet of F-15Cs and one RC-26B aircraft. The 144th FW is comprised of the Headquarters Staff and four subordinate units. The 144th FW has been awarded a number of honors and distinctions throughout its history (Fresno ANGB, 2018).

Support operations at Fresno ANGB include aircraft fueling and maintenance, fire protection and support, ground vehicle fueling and maintenance, aerospace support equipment maintenance and facilities maintenance (AECOM 2018). Operations related to the use and/or storage of AFFF has historically occurred at various locations at Fresno ANGB to provide support to the overall 144th FW mission (BB&E, 2016). AFFF is used for fighting Class B Liquid Hydrocarbon fires, The ANG has historically used AFFF for various mission support activities, including for firefighting training exercises, suppressing aircraft/vehicle fires, and in aircraft hangar fire suppression systems (FSS) (AECOM 2018).

# 2.2 PRL History

No PFAS focused investigations have been completed at Fresno ANGB. As described above, a base-wide PA site visit was conducted at Fresno ANGB from 5 January 2016 through 6 January 2016 to assess known and potential releases of PFAS at various areas known to have stored or released AFFF or other PFAS containing products (BB&E, 2016). The PA Report included assessments of sites to determine if there was sufficient information to indicate if a potential release of PFAS could impact human health and the environment.

As part of the PA, a total of nine PRLs were identified as requiring further investigation. **Figure 2-1** provides the locations for each of these 9 PRLs. Brief histories associated with PFAS usage at the PRLs are provided below.

### 2.2.1 Former Fire Training Area (PRL 1)

The Former Fire Training Area (FTA) – Installation Restoration Program (IRP) Site 1 covers approximately 0.4 acres and is located in the Northeast portion of Parcel A which is in the Southeast portion of the Fresno-Yosemite IAP. The FTA was constructed as a circular, 10-inch high, unlined earthen berm approximately 60 feet in diameter. Firefighting training activities were executed at this location between the late 1950s and early 1970s. Flammable sources used during training exercises include used oil, jet propulsion fuel #4, solvents, and aviation gasoline. Between 25,000 and 40,000 gallons of flammable material were used at the FTA over this time period. After igniting the flammable materials for firefighting training, the flames were allowed time to burn until they began to die down at which point the flames were extinguished with AFFF. The AFFF used in the training exercises was protein-based foam consisting of approximately 6% AFFF diluted with 94% water. Sodium bicarbonate, also referred to as Purple K, was used as a dry chemical extinguisher at the FTA as well. At the FTA, an estimated 500 to 1,000 gallons of flammable material was used each month at this PRL (BB&E, 2016).

### 2.2.2 Aircraft Parking Ramp (PRL 2)

The Aircraft Parking Ramp is a large concrete area where drainage is characterized by sheet flow into either grassy, vegetated areas to the north or storm drains lining the southern portion. Although there are not any documented releases of AFFF to the aircraft parking apron, this area was included as a PRL in the PA Report due to the potential use and discharge of AFFF associated with this area (BB&E, 2016).

### 2.2.3 Building 145 - Fire Station (PRL 3)

Building 145 was built in 1992 and has operated as the Fire Station since. At the time of the PA site visit, the base had four Aircraft Rescue and Fire Fighting (ARFF) vehicles in service, including a P-34 vehicle carrying 70 gallons of AFFF, a P-19 vehicle carrying 130 gallons of AFFF, a P-22 vehicle carrying 50 gallons of AFFF, and a Stryker carrying 220 gallons of AFFF. Additionally, Trailer 2 sits on the east apron and is used for storage of 350 gallons of AFFF. At that time, base personnel indicated that AFFF was transferred to Trailer 2 via five gallon containers. Trailer 2 was used to fill all ARFF vehicles since the new station was built. There have been no known releases of AFFF within or around the Fire Station. In the event of an accidental release of AFFF, the discharged material would flow into the floor drains within the Fire Station which are connected to an oil/water separator (OWS) which is connected to the storm sewer. ARFF vehicles were stored and washed within the Fire Station; any wash fluid would discharge to the floor drains (BB&E, 2016).

### 2.2.4 Building 100 - Aircraft Hangar (PRL 4)

Building 100 was constructed in 1955 and is equipped with an FSS, which was supplied with AFFF between 1994 and 2007. According to the PA Report, the FSS was retrofitted for use of high expansion foam (HEF) after 2007. The FSS contained approximately 400 gallons of AFFF and was likely tested every two to three years, with the last test in 2005. The PA Report stated that base records indicated some of the valves on the FSS would leak AFFF to the floor when touched. During FSS system testing, it is estimated by base personnel that approximately 10 gallons of AFFF was discharged. Base personnel believe there was an accidental release of AFFF from the FSS prior to 2004; however base records could not confirm the release. AFFF discharged from the FSS was washed into trench drains within the hangar. The trench drains discharge to a 5,000 gallon underground holding tank located southeast of the hangar which connects to the storm sewer. The holding tank also receives storm water runoff from the Aircraft Parking Ramp. According to base personnel, the holding tank has a valve that is normally kept in the closed position to contain water for inspection prior to release to the storm sewer. It is unknown if the AFFF discharged into this holding tank was removed and sent for offsite disposal or released to the storm sewer (BB&E, 2016).

### 2.2.5 Building 157 - Fuel Cell (PRL 5)

Building 157 was built in 1988 and a FSS supplied with AFFF was installed in 1994 and was in place through 2007. The PA Report stated that the FSS was retrofitted in 2007 to support use of HEF. The FSS was tested every two to three years and it was noted by base personnel that during FSS testing, approximately 10 gallons of AFFF would be discharged with each testing. Additionally, the valves of the FSS reportedly leaked. The discharged AFFF was washed into trench drains within the building which connected to a 1,000 gallon OWS that discharges to the sanitary sewer (BB&E, 2016).

### 2.2.6 Building 104 - Former Fire Department (PRL 6)

Building 104 which was built in 1957 served as the original Fire Department until 1992 when the new Fire Department, Building 145, was constructed. The PA Report noted that AFFF was stored on the parking apron to the east of the building. ARFF vehicles were washed and filled up with AFFF on the parking apron as well. There are no known releases of AFFF in or around the former fire station. If any releases did occur within the building or on the apron to the east, the AFFF would have been washed down or left to dissipate (BB&E, 2016).

### 2.2.7 Stormwater Discharge Point 01 (PRL 7)

Storm water from the northern most drainage area (DA-01) flows into storm drains that are conveyed to a storm water line that runs east to west along Air Guard Road. The current Fire Station, Building 145 (PRL 3) is located within DA-01. AFFF discharged into DA-01 will enter the storm sewer at this PRL through surface water flow or water washed into floor drains. The storm sewer eventually discharges into the collection basin located directly west of the base at the corner of McKinley and Peach Avenue (BB&E, 2016).

### 2.2.8 Stormwater Discharge Point 04 (PRL 8)

Drainage area 04 (DA-04) constitutes the eastern portion of the Base. Aircraft Parking Ramp (PRL 2), Building 157 Fuel Cell (PRL 5) and Former FTA (PRL 1) are located in this drainage area. Storm water from this drainage area flows into a storm water line that runs east west within the base and eventually discharges into the collection basin located directly west of the base at the corner of McKinley and Peach Avenue (BB&E, 2016).

### 2.2.9 Stormwater Discharge Point 06 (PRL 9)

Drainage Area 06 (DA-06) at Fresno ANGB includes Building Aircraft Parking Ramp (PRL 2), 100 Aircraft Hangar (PRL 4) and Building 104 Former Fire Department (PRL 6) and is located on the mid-east portion of the base. Storm water from this drainage area and the hangar trench drains discharge to an OWS/holding tank southeast of the hangar. According to base personnel, a storm water/spill control valve is kept in the closed position and is typically opened during storm events. The OWS/holding tank discharges to the storm water line that runs east and west along Air Guard Base, which eventually discharges into the collection basin located directly west of the base at the corner of McKinley and Peach Avenue (BB&E, 2016).

# 2.3 Regulatory Framework

PFAS are not currently regulated at the federal level and are not regulated in soil or groundwater by the state of California; however, the Regional Water Quality Control Board (RWQCB) implemented interim notification requirements for water supply wells. The RWQCB has adopted notification criteria of 13 ng/L for PFOS and 14 ng/L for PFOA in water supply wells (DDW, 2018). The US EPA has established lifetime HA levels for PFOS and PFOA to protect against potential risk from exposure to these compounds via drinking water; additionally, the US EPA established a tapwater Regional Screening Level (RSL) for Perfluorobutanesulfonate (PFBS). Project action levels (PALs) for PFOS, PFOA and PFBS in soils were calculated using the US EPA RSL calculator to establish the PALs. The PALs are detailed in Appendix C, Laboratory Quality Assurance Project Plan in the WP (AECOM, 2018). There are no PALs for Perfluoroheptanoic acid (PFHpA), Perfluorohexanesulfonate (PFHxS), or Perfluorononanoic acid (PFNA). PALs for PFOS, PFOA, and PFBS include:

#### Groundwater:

- <u>PFOS and PFOA</u>: A PAL of 70 ng/L was selected for PFOS and PFOA; it is the US EPA drinking water HA level for screening the individual and combined (PFOS + PFOA) groundwater concentrations (USEPA, 2016a,b,c).
- <u>PFBS</u>: A PAL of 400,000 ng/L was selected for PFBS; it is the May 2018 US EPA generic tapwater RSL that was derived using a target hazard quotient (THQ) equal to 1.0 and is protective of a residential receptor drinking the water (US EPA, 2018).

#### Soil:

 PFOS and PFOA: PALs of 1,260 nanograms per gram (ng/g) for both PFOS and PFOA were conservatively calculated using the US EPA RSL calculator (May 2018 version). The calculated PALs were derived using a THQ equal to 1.0 and are protective of a residential receptor coming into direct contact with soil (i.e., incidental

- ingestion of soil, dermal contact and outdoor inhalation of particulates) (US EPA, 2018).
- O PFBS: A PAL of 1.26 x 10<sup>6</sup> ng/g for PFBS was conservatively calculated using the US EPA RSL calculator (May 2018 version). The calculated PAL was derived using a THQ equal to 1.0 and is protective of a residential receptor coming into direct contact with soil (i.e., incidental ingestion of soil, dermal contact and outdoor inhalation of particulates) (US EPA, 2018). US EPA does provide a generic residential direct contact soil RSL of 1.30 x 10<sup>6</sup> ng/g dated May 2018 (US EPA 2018). However, the Air National Guard (ANG) bases around the country have chosen to use the more stringent, calculated RSL for screening PFBS.

PALs were not specifically defined for surface water and sediment in the SI WP (AECOM, 2018), for purposes of this SI Report, they are defined as follows:

- Surface Water: There are no surface water specific screening criteria due to the absence of state
  or federal guidance levels; therefore, surface water PALs are equivalent to groundwater PALs,
  defined above.
- Sediment: There are no sediment specific screening criteria due to the absence of state or federal guidance levels; therefore, sediment PALs are equivalent to the soil PALs, defined above.

Where multiple criteria exist, the more conservative screening value is used. The PAL for each COPC by media and analytical method are presented below.

	Groundwater and Surface Water	Soil and Sediment
Analyte	(ng/L)	(ng/g)
PFOS	70	1,260
PFOA	70	1,260
PFBS	400,000	1.26 x 10 <sup>6</sup>
PFOS + PFOA	70	Not Applicable

Analytical data are compared to these PALs and included in Appendix B.

# 3. Environmental Setting

This section describes the topography and site conditions found at Fresno ANGB.

### 3.1 Site Topography and Drainage

Fresno ANGB is co-located with Fresno-Yosemite IAP in Fresno California. The Fresno ANG currently leases the 111-acre property on the southeast corner of the Fresno-Yosemite IAP from the City of Fresno (BB&E, 2016).

Fresno ANGB is relatively level and slopes to the southwest. The elevation of the base ranges between 324 and 331 feet above mean sea level (amsl). Due to the general slope of the base, surface water flows generally to the south and southwest, toward Mill Ditch (canal along McKinley Avenue) and a regional storm water collection basin located on the airport site at the northeast corner of McKinley and Peach Avenues, directly west of the base. The storm water collection basin is maintained by the City of Fresno, and receives discharges from the municipal storm sewer system and the Fresno-Yosemite IAP (BB&E, 2016).

Surface runoff from the basin is discharged into Mill Ditch via a pump station located at the basin. Additionally, a 100-year floodplain associated with Mill Ditch has been identified by the United States Federal Emergency Management Agency along the southern boundary of the Fresno-Yosemite IAP property. However, only a small portion of the Base, along McKinley Avenue, would be subject to flooding during a 100-year storm event (BB&E, 2016).

### 3.2 Site Geology/Hydrogeology

Fresno ANGB is located along the eastern margin of California's San Joaquin Valley. In the San Joaquin Valley, the principle freshwater-bearing units are the unconsolidated deposits that extend to depths of 3,500 feet below ground surface (ft bgs). Groundwater is found in the unconfined or semi-confined conditions within alluvial fan deposits in the eastern portion of the Central Valley, where the Fresno ANGB is located. The unconsolidated valley floor alluvium deposits are characterized by fine-grained silt and sand. Localized clay beds are also common below 200 ft bgs. Finer sediments such as silts and clays are associated with overbank and floodplain deposits, whereas coarser sediments such as sands and gravels are associated with levee, channel lag, and point bar deposits (BB&E, 2016).

The Sierra Nevada Mountains form the physiographic barrier on the eastern side of the San Joaquin Valley. Groundwater stored in the alluvial deposits is bounded on the eastern flanks and below by the consolidated Cretaceous and Tertiary sedimentary rocks and Sierra Nevada granitic rocks. Seven waterbearing zones have been identified in the vicinity of the base; these units contain a higher percentage of sand compared to the intervening aquitards, which are primarily silt with secondary sand and clay. First encountered groundwater at the base ranges between 80-120 ft bgs. Direction of regional groundwater flow is generally south-southwest (BB&E, 2016), though during the SI field activities the local groundwater flow was northwest.

# 3.3 Critical Habitat and Threatened/Endangered Species

No species of flora or fauna that are listed as threatened or endangered, as designated by the U.S. Fish and Wildlife Service, are present within a 1-mile radius of the base. Additionally, The United States Fish & Wildlife Service Threatened & Endangered Species Active Critical Habitat Report online GIS tool does not show any critical habitats are located within a 1-mile radius of the base (US FWS, accessed 20 September 2018).

### 3.4 Potential Receptors

#### 3.4.1 Groundwater

Potential human exposure pathways related to groundwater are the use of any drinking water and irrigation wells used for public or private water supply or irrigation purposes, respectively. There are currently no known drinking water supply wells at the base. Base personnel and records indicate the base is provided water via three City of Fresno public water supply wells (BB&E, 2016, 144th Medical Group, 2013). Fifteen wells are located within 1.0 mile of the Fresno ANGB (BB&E, 2016).

Three of the fifteen wells are owned by the United States Geological Survey (USGS) California Water Science Center and are located to the southwest, south-southeast, and north-northwest of the base. The status and use for these three USGS wells was not identified in the PA Report (BB&E, 2016).

The remaining twelve of the fifteen wells listed in PA Report are listed as water wells on the California Wells database. One of these wells, noted to be within 1/8 mile southeast of the base, is owned by the Fresno ANG.

According to the PA Report, no federal public water supply system wells were identified within one mile of the base; however, according to base personnel and base records, there are three City of Fresno public water supply wells within one mile of the base that supply the base with potable water (BB&E, 2016).

Depth to groundwater was measured at seven monitoring wells as part of the SI field work. As described above, depth to groundwater is approximately 111 to 120 ft bgs (see **Table 3-1**), with two dry wells all screened above 102 ft bgs, and flows to the southwest (see **Figure 3-1**).

Well depth for the surrounding USGS water wells is only included in two of the three database entries (USGS wells) and are 82 and 397 feet. Well depth in the remaining water well is unknown (BB&E, 2016).

#### 3.4.2 Surface Water and Sediment

Potential human exposures from surface water and sediment pathways include use of surface water for drinking water, recreation and fisheries. Potential ecological receptors and exposures include sensitive environments and protected species that may be associated with the surface water. The surface water from the site is not a primary source of drinking water so there is currently not an exposure pathway for human and ecological receptors on-base; however, there is a potential for a complete exposure pathway off-base as a result surface water from the base discharging to nearby surface water bodies (e.g., Mill Ditch).

Surface water at the base is controlled runoff. The majority of the site is paved with storm drains and sloped pavement to control drainage. Adjoining areas have grass covered landscaping with drainage ditches to control runoff. Surface runoff from the vast majority of Fresno ANGB flows south, southwest towards Mill Ditch (along McKinley Avenue) and a regional storm water collection basin located on the airport site at the northeast corner of McKinley and Peach Avenues, directly to the west of the Fresno ANGB. As noted above, much of the base is paved and natural habitat for ecological receptors is limited; therefore, potential ecological exposures to impacted surface water are expected to be negligible.

In addition, the reported precipitation was a trace amount in May 2018 and 0 inches in June 2018, when the SI field work was completed (NOAA, 2018). Therefore, surface water was not sampled. In addition, there was no sediment present at Stormwater Discharge Point 06 (PRL 9).

Ecological receptors may also be exposed to sediment associated with the surface water outfalls if sufficient habitat is present to support or attract terrestrial flora and fauna including burrowing animals. The presence of this media on-base is limited because there are no surface water bodies; therefore, the potential presence of SI COPCs in sediments likely presents minimal human/ecological risk, but should be evaluated during the Expanded SI or RI, and in seasons where surface water exists.

### 3.4.3 Soil and Air Migration Pathways

Exposure to surface and subsurface soils may occur during routine activities or during construction and excavation activities. Ecological receptors may also be exposed to soils if sufficient habitat is present to support or attract terrestrial flora and fauna including burrowing animals.

Fresno ANGB is currently zoned for public and institutional activities, and the surrounding area includes zoning for residential, light industrial, commercial, open space, and office uses. Fresno ANGB includes paved and landscaped areas and as such, there are limited pathways to soil and air migration from disturbed soils under normal operating conditions; however, during excavation, a worker could be exposed to soil and dust from soil.

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# 4. Investigation Activities

Field activities were completed to achieve the field objectives, which were to determine the presence or absence of PFAS at Fresno ANGB in various media and to determine if PFAS have the potential to migrate off-base. The field activities were completed between May 2018 and June 2018 in accordance with the WP except as noted in **Section 4.10**.

# 4.1 Pre-Investigation Activities

### 4.1.1 Public and Fresno ANGB Utility Clearance

On 5 May 2018, AECOM personnel called the USA North 811 Dig Alert hotline to alert local utilities that field work was going to commence on 14 May 2018. AECOM personnel coordinated with Lt. Col. John Macedo, base Environmental Manager (EM), and Pacific Coast Locators (private utility locating subcontractor) onsite to mark out boring locations, locate existing utilities, and perform site reconnaissance prior to the site investigation event. AECOM reviewed and finalized the boring locations on 14 May 2018 through 15 May 2018 so as to ensure no damage or puncture to any subsurface infrastructure would occur while performing field work. Locations of the monitoring wells were cleared with a hand auger or an air knife rig to a depth of 10 ft bgs.

#### 4.1.2 Source Water

City of Fresno potable water was used to decontaminate all equipment used throughout the SI. A potable water sample was collected by AECOM personnel on 3 March 2018 prior to starting drilling activities to confirm that the water was PFAS-free. The sample was analyzed for the six UCMR-3 PFAS and the results were lower than one-tenth of those with regulatory standards. The potable water was deemed PFAS-free to use for large equipment decontamination. The analytical results are provided in **Appendix D**.

# 4.2 Environmental Investigation and Sampling

The SI sampling locations were based on historical data, potential source areas, and site conditions as observed during the PA site visit. Following utility clearance and Accident Prevention Plan review and documentation, subsurface drilling and sampling commenced on 14 May 2018. Field activities occurred through 29 June 2018.

All samples were collected into laboratory-supplied containers and submitted to the analytical laboratory for analysis of selected parameters. Samples were packaged on ice and transported weekly via overnight commercial carrier under standard chain-of-custody procedures to the laboratory.

Quality control (QC) samples collected as part of the SI included field duplicates, matrix spike and matrix spike duplicate (MS/MSD) samples, equipment blanks and trip blanks. Field duplicates were collected at a rate of 10% with MS/MSD samples collected at the rate of 5%. QC samples were analyzed for the same parameters as the accompanying parent samples. Field reagent blanks accompanied each cooler containing samples for PFAS analysis. A temperature blank was also placed in each cooler to check that samples were preserved at or below four degrees Celsius during shipment. All samples were analyzed for PFAS via US EPA Method 537 rev 1.1 modified.

The following samples were collected at Fresno ANGB and analyzed for PFAS via US EPA Method 537 rev 1.1 modified to support the project objectives:

- Collection of 34 soil samples (plus 4 duplicate samples) from 17 soil boring locations;
- Collection of 5 groundwater samples (plus one duplicate sample) from existing and new monitoring wells downgradient from the PRLs and at the base boundary; and
- Collection of 2 sediment samples (plus one duplicate sample).

Surface water was to be collected from PRLs 7, 8, and 9, in accordance with the WP (Stormwater Discharge Points 01, 04, and 06, respectively); however, surface water was not present at the time of the SI field activities. Sediment was to be collected at PRL 9 (Stormwater Discharge Point 06), but was not present during SI field activities. Therefore, surface water samples were not collected from PRLs 7, 8, and 9, and no sediment sample was collected from PRL 9.

Figure 4-1 provides the sample locations for all media across the entire base.

### 4.3 Soil Borings

Soil samples were collected by hand auger. The soil cores were screened for volatile organic compounds (VOCs) with a photoionization detector (PID) immediately upon opening the collection. Lithology for each soil core was recorded on a soil boring log (see **Appendix C-1**). On the night of 30 May 2018, the field vehicle was burglarized and the field notes from 14 May 2018 through 25 May 2018 were stolen. The boring logs were recreated from memory and may not contain complete or accurate information on recovery thickness, PID concentrations, moisture, relative density, color, texture, lithological descriptions, odors, groundwater or perched water depth, organic material, cultural debris, or color changes indicating staining. Since additional investigation is recommended in Section 7, these data points can be completed in the next sampling phase.

It should be noted that PFAS do not volatilize similar to VOCs or other gases; therefore, PID results are not necessarily indicative of the presence of PFAS. However, PID readings can be used to evaluate the presence of other potential contaminants which may have been released with PFAS (e.g., the JP-4 spill at Former FTA [PRL 1] and subsequent application of AFFF). Other contaminants (e.g., VOCs) can impact the fate and transport of PFAS in soil and groundwater.

Two soil samples were collected from each boring, with the first sample collected from the surface at 0.0 to 1.0 ft bgs and the second from 4.0 to 5.0 ft bgs. Most soil samples were collected from borings separate from the monitoring well locations as the soil boring locations were strategically positioned to maximize the potential for identifying "source" level releases of PFAS; whereas monitoring well locations were positioned to evaluate groundwater downgradient of the PRLs (and at the base boundary).

Following collection of the soil and groundwater samples, all boreholes not associated with a monitoring well were abandoned either to surface with bentonite (in grassy areas) or completed at ground surface with concrete or cold patch asphalt depending on the location.

# 4.4 Monitoring Well Installation/Groundwater Sampling

Permanent wells were installed using limited access rig hollow stem auger (HSA) and constructed of 10-ft sections of riser, 10-ft of 0.010-inch slotted well screen of 2-inch diameter Schedule 40 polyvinyl chloride with a threaded bottom cap. Monitoring wells were installed in accordance with US EPA Guidance and the *Environmental Restoration Program, Air National Guard Investigation Guidance* (ANG, 2009). The well screens were installed such that they "straddled" the water table. A filter pack of 20/40 silica sand was installed in the annulus around the well screen to a minimum of 2-ft above the well screen. A bentonite seal 3- to 9- ft thick was placed above the filter sand and hydrated with distilled water and observed by Cynthia Fischer, the Water System Supervisor for the City of Fresno. Bentonite grout was placed in the well annulus from the top of the bentonite seal to ground surface. The bentonite grout was allowed to set for a period of 24-hours prior to well completion. Any soil generated during the sampling event was containerized in 55-gallon drums as investigation-derived waste (IDW) (discussed in **Section 4.9**).

Newly installed groundwater monitoring wells were developed no sooner than 24-hours after installation and prior to collecting groundwater samples in order to remove fine soils from the bottom of each well and from the surrounding sand pack. Well development was completed in accordance with the WP and AECOM standard operating procedure (SOP) 3-13 "Monitoring Well Development". **Appendix C-2** includes well development logs including water level, turbidity and flow rates. Water obtained during development was containerized in 55-gallon drums as IDW.

Following development, monitoring wells were sampled using low-flow sampling methods using a PFAS-free bladder pump in accordance with the WP and AECOM SOP 3-14 "Monitoring Well Sampling". Groundwater samples were obtained from three new and two existing monitoring wells. Purge water was containerized in 55-gallon drums as IDW. New dedicated high-density polyethylene tubing was used at each well. Non-dedicated equipment was decontaminated in accordance with the WP. Equipment blanks were collected to monitor the potential for cross-contamination between wells. Field parameters including flow rate, depth to water, turbidity, temperature, specific conductivity, pH, dissolved oxygen, and oxidation-reduction potential were collected to ensure that the groundwater was stabilized prior to sample collection. **Table 4-1** provides a summary of the monitoring well construction details for the seven wells that were included in this SI. **Appendix C-1** includes boring logs and well construction diagrams for the new wells. Groundwater sampling logs are provided in **Appendix C-3**.

# 4.5 Surface Water and Sediment Sampling

Two sediment samples were collected at PRLs 7 and 8 (Stormwater Discharge Points 01 and 04). The sample was collected at the point where the storm water discharges into the receiving waters close to the storm sewer pipe discharge area. Per the WP, the sample was collected within the base property boundary and in accordance with AECOM SOPs 3-22 ("Sediment Sampling"). The samples were collected utilizing PFAS free collection devices.

Surface water was to be collected from PRLs 7, 8, and 9 (Stormwater Discharge Points 01, 04, and 06, respectively), and sediment was to be collected from PRL 9 (Stormwater Discharge Point 06); however, surface water and/or sediment was not present at these locations during the time of the SI. No precipitation was recorded by National Oceanic and Atmospheric Administration (NOAA) weather stations during May or June, 2018 (NOAA, 2018). Therefore, no samples were collected.

### 4.6 Potential Release Location Activities

The following sections describe the field activities at each PRL as well as groundwater monitoring activities at the base boundary wells.

Figure 4-1 provides the sample locations for all media across the entire base.

### 4.6.1 Former Fire Training Area (PRL 1)

Three soil borings (FTA-SB01, FTA-SB02, and FTA-SB03) and associated soil sampling were completed on 21 May 2018. There was no evidence of PFAS impacts and no readings on the PID. Soil samples were collected from each of the soil borings from 0.0-1.0 ft bgs and 4.0-5.0 ft bgs. One duplicate sample was collected from FTA-SB02 at 5 ft bgs. Monitoring well FTA-MW01 was cleared with an air knife on 29 May 2018, drilled with the HSA rig on 31 May 2018 and was installed on 31 May 2018 through 1 June 2018. One groundwater sample, matrix spike and matrix spike duplicate were collected from FTA-MW01 on 29 June 2018.

#### 4.6.2 Aircraft Parking Ramp (PRL 2)

Five soil borings (APR-SB01, APR-SB02, APR-SB03, APR-SB04, and APR-SB05) and associated soil sampling were completed from 16 May 2018, to 18 May 2018. PID readings ranged from 0.0 parts per million (ppm) to 0.2 ppm. Soil samples were collected from each of the soil borings from 0.0 – 1.0 ft bgs and 4.0-5.0 ft bgs. One duplicate sample was collected from APR-SB01 at 5 ft bgs. Monitoring well APR-MW01 was cleared on 16 May 2018 with an air knife, and drilling commenced on 23 May 2018. The monitoring well could not be installed due to anomalous mounded groundwater encountered approximately 100 feet shallower than the water table in the surrounding area, approximately 25 ft bgs. The City of Fresno and the ANG established that the groundwater was likely from a leaking, underground water pipeline that had been capped but not drained. An alternative location was not attempted because of the density of utilities in the area, and the groundwater in the vicinity would have been diluted by the

mounded groundwater and was considered to be not representative of the unconfined aquifer targeted by the SI. No monitoring well was constructed and no groundwater sample was collected from APR-MW01.

Data from soil borings 145-SB02, 145-SB03, 100-SB01, 157-SB01, 157-SB02 were also used to evaluate soil impacts from the Aircraft Parking Ramp (PRL 2). Data from monitoring wells 145-MW01, 100-MW01 and FTA-MW01 were used to evaluate groundwater impacts from the Aircraft Parking Ramp.

### 4.6.3 Building 145- Fire Station (PRL 3)

Three soil borings (145-SB01, 145-SB02, and 145-SB03) and associated soil sampling were completed on 16 May 2018 and 17 May 2018. PID readings ranged from 0.0 ppm to 0.2 ppm. Soil samples were collected from each of the soil borings from 0.0 – 1.0 ft bgs and 4.0 – 5.0 ft bgs. Soil boring 145-SB01 was advanced using a HSA rig to 135.2 ft bgs and converted to monitoring well 145-MW01. Monitoring well 145-MW01 was drilled on 13 June 2018 and installed on 14 June 2018. One groundwater sample and duplicate was collected from 145-MW01 on 26 June 2018.

#### 4.6.4 Building 100- Aircraft Hangar (PRL 4)

One soil boring (100-SB01) and associated soil sampling was completed on 17 June 2018. There was no evidence of PFAS impacts or readings on the PID. Soil samples were collected from each of the soil borings from 0.0 – 1.0 ft bgs and 4.0 – 5.0 ft bgs. One duplicate sample was collected from 100-SB01 at 5 ft bgs. Monitoring well 100-MW01 was cleared of utilities on 16 May 2018, drilled on 22 May 2018 through 23 May 2018, and installed on 23 May 2018 through 24 May 2018. One groundwater sample was collected from 100-MW01 on 29 June 2018.

Data from soil borings APR-SB02, 104-SB01, and 104-SB02 were also used to evaluate soil impacts present at Building 100- Aircraft Hangar.

#### 4.6.5 Building 157- Fuel Cell (PRL 5)

Three soil borings (157-SB01, 157-SB02, and 157-SB03) and associated soil sampling were completed on 18 May 2018. There was no evidence of PFAS impacts or readings on the PID. Soil samples were collected from each of the soil borings from 0.0 - 1.0 ft bgs and 4.0 - 5.0 ft bgs. One duplicate sample was collected from 157-SB02 from 1.0 ft bgs. The monitoring well intended to monitor groundwater downgradient of this PRL was proposed as APR-MW01, which was not installed due to anomalous mounded groundwater. No groundwater sample was collected due to the difficulties described in **Section 4.6.2**.

Data from soil boring APR-SB04 was also used to evaluate soil impacts from Building 157.

#### 4.6.6 Building 104- Former Fire Department (PRL 6)

Two soil borings (104-SB01, 104-SB02) and associated soil sampling were completed on 16 May 2018 and 17 May 2018. There was no evidence of PFAS impacts or readings on the PID. Soil samples were collected from each of the soil borings from 0.0 – 1.0 ft bgs and 4.0 – 5.0 ft bgs. Monitoring well 100-MW01 was installed on 23 May 2018 through 24 May 2018 as a shared well to evaluate potential impacts down-gradient of Building 104.

#### 4.6.7 Stormwater Discharge Points 01, 04, 06 (PRL 7, PRL 8, PRL 9)

Two sediment samples (FR-OF1-SD01, FR-OF4-SD01) were collected in the storm water outfalls, whereas the storm water outfall 06 did not contain enough sediment for sampling. No surface water was available from any storm water outfall to sample.

#### 4.6.8 Base Boundary Wells

According to the SI WP, groundwater samples were proposed to be collected from two new wells and from up to four existing wells to evaluate whether PFAS are migrating off-site. As discussed above, the

monitoring well proposed to be installed at the Aircraft Parking Ramp (PRL 2) was not installed due to anomalous, shallow groundwater which may be associated with a leaking water pipe. Monitoring well 100-MW01 was installed at Building 100- Aircraft Hangar (PRL 4) (see **Section 4.6.4)** and the data were used to evaluate off-base migration.

Existing monitoring wells HFMW-46B and MWBP-09C were sampled on 27 June 2018.

Three existing monitoring wells (HFMW-28C, MW4-02, and MWBP-08) could not be located and two existing monitoring wells (MW4-01 and MWBP-09A) were dry.

### 4.7 Groundwater Level Measurements

Water levels were obtained from the five saturated monitoring wells that were included in this SI during two events, 15 June 2018 and 26 - 29 June 2018. Water level measurements and screened intervals are provided in **Table 3-1** and **Table 4-1**, respectively. A potentiometric contour map is provided as **Figure 3-1**, which shows groundwater flows predominantly to the northwest. The potentiometric surface contours in Figure 3-1 suggest that the anomalous groundwater encountered at APR-MW01 has created a groundwater mound that changed the local groundwater flow direction from the southwest to the northwest.

# 4.8 Surveying

All of the monitoring wells installed as a part of the SI were surveyed by Bedrock Engineering, Inc., a licensed surveyor in the State of California on 17 August 2018. Survey data collected from each well included a latitude and longitude measurement and top of casing elevation. Surveying measurements were collected according to the North American Datum of 1983 California State Plane Zone IV Coordinate System using North American Datum of 2011, and were measured to an accuracy of 0.1 ft. Elevation measurements are based on the National Geodetic Vertical Datum of 1988, and measured to an accuracy of 0.01 ft. Survey results are provided in **Appendix C-3**.

# 4.9 Investigation-Derived Waste

Twenty-two drums of soil and twenty drums of decontamination water, development water and purge water were containerized in new 55-gallon steel drums for storage pending disposal, and staged onsite at a base-designated area. The IDW was removed from site as non-hazardous, non-regulated material on 24 September 2018. The disposal contractor used the base-wide PFAS SI soil and groundwater analytical data to characterize the waste and prepare the waste profile. IDW-associated documentation is located in **Appendix E.** 

#### 4.10 Deviations from the SI Work Plan

Deviations from the WP occurred based on field conditions (e.g., due to the presence of utilities). Deviations from the WP are noted below:

• New well APR-MW01 was attempted but not installed after investigation into the mounded groundwater encountered at 25 ft bgs. The City of Fresno and the ANG established that the groundwater was likely from a leaking, underground water pipeline that had been capped but not drained. An alternative location was not attempted because of the density of utilities in the area, and the groundwater in the vicinity would have been diluted by the mounded groundwater and was therefore not representative of the unconfined aquifer targeted by the SI.A site walk of AECOM personnel with the base EM on 15 June 2018 resulted in the identification four of the seven existing base boundary wells. Of the four wells that were located, two were dry during the field effort and could not be sampled. The WP stated that a maximum of four existing base boundary wells would be sampled in the SI field effort, but the groundwater level (in two of the four) as well as the inability to locate three existing monitoring wells precluded AECOM personnel's ability to sample four existing monitoring wells.

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- Surface water samples were not collected from Storm Water Discharge Points 01, 04, or 06 because no surface water was present on site during the field effort. Storm Water Discharge Point 06 did not contain enough sediment in the manhole for sample collection.
- Overnight from 30 May 2018 to 31 May 2018, the field vehicle AECOM personnel had been storing field notes in was burglarized. Field notes from 14 May 2018 through 25 May 2018 were stolen with the PID. The incident was relayed to the Fresno Police Department, project management, ANG Program Manager, and the appropriate incident reporting programs immediately upon discovery. The boring logs in **Appendix C-1** were recreated by the field team and may not contain as much detail as the original logs.

# 5. Site Inspection Results

Analytical results were evaluated to determine the presence or absence of PFAS in soil, surface water or sediment (if present) at each PRL and in groundwater downgradient of PRLs, and assess if PFAS from the base are migrating off-base. The six PFAS that were sampled and analyzed during the PFAS investigations per ANG guidance (ANG 2009) were:

- PFBS
- PFHpA
- PFHxS
- PFNA
- PFOS
- PFOA

Analytical results for PFOS, PFOA and PFBS were compared against the PALs described in **Section 2.3**. As described above, there are no PALs for PFHpA, PFHxS, or PFNA.

### 5.1 Data Usability

The laboratory analytical data generated during the SI were reviewed for conformance with the project DQOs specified in the SI Work Plan and to ensure that the precision and accuracy of the data were adequate for their intended use. All analytical data were found to be useable (as qualified). **Appendix D** contains the data validation report, which details the scope, quality assurance/QC sample collection and analysis, and results of the analytical data review and validation.

Detected concentrations below the level of quantitation (LOQ) are reported with a 'J' flag. The LOQ is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias. During data validation, the J flag was further qualified. Validation flag "J+" means the analyte is present; however, the reported value may not be accurate or precise, and the result may be biased high. Alternatively, "J-" means the analyte is present; however, the reported value may not be accurate or precise, and the result may be biased low. Measurements between the detection limit and the LOQ assure the presence of the analyte with confidence, but their numeric values are estimates (Department of Defense [DOD], 2009).

Non-detections are reported as the limit of detection (LOD) followed by a 'U' flag. The LOD is the smallest amount or concentration of a substance that must be present in a sample to be detected at a 99% confidence level. The failure to obtain a detection is reported as "<LOD" because the false-negative rate at the LOD is 1% (DOD, 2009). In the instances where a result was qualified due to a blank detection, the non-detects are reported as the LOD followed by a 'U\*' flag to indicate the flag was changed during data validation.

The data review and validation performed on the entire data set indicate overall high quality of the definitive-level data collected for this site. None of the data were qualified as rejected and completeness for this data set is 100 percent. Results qualified as estimated are generally for marginal QC exceedances and blank-qualified results below or near the LOQs, and the qualifications do not significantly affect project objectives.

# 5.2 Former Fire Training Area (PRL 1)

**Table 5-1** summarizes the analytical results and **Figure 5-1** shows the PFAS detections in the sampling around the Former Fire Training Area (PRL 1). PFAS were detected in the groundwater and soil samples collected.

PFBS, PFHpA, PFHxS, PFNA, and PFOA were detected in the groundwater sample collected from monitoring well FTA-MW01. PFOA was detected above the individual PAL of 70 ng/L at a concentration of 170 ng/L. PFBS was detected at a concentration of 120 ng/L, below the PAL of 400,000 ng/L. PFHpA was

detected at a concentration of 590 ng/L, PFHxS was detected at a concentration of 1,300 ng/L, and PFNA was detected at a concentration of 0.75 J ng/L; however, there are no PALs for these compounds.

PFHpA, PFHxS, PFOS, and PFOA were detected in the soil samples collected from PRL 1. PFOS and PFOA were detected at maximum concentrations of 18 ng/g and 17 ng/g, respectively, below the PAL of 1,260 ng/g. PFHpA was detected at a maximum concentration of 0.88 ng/g and PFHxS was detected at a maximum concentration of 12 ng/g; however, there are no PALs for these compounds.

### 5.3 Aircraft Parking Ramp (PRL 2)

**Table 5-2** summarizes the analytical results and **Figure 5-2** shows the PFAS detections in the sampling around the Aircraft Parking Ramp (PRL 2).

PFHpA, PFHxS, PFNA, PFOS, and PFOA were detected in the soil samples collected from PRL 2. PFOS and PFOA were detected at maximum concentrations of 70 ng/g and 4.7 J ng/g, respectively, below the PAL of 1,260 ng/g. PFHpA was detected at a maximum concentration of 0.85 ng/g, PFHxS was detected at a maximum concentration of 5.2 ng/g, and PFNA was detected at a maximum concentration of 1.2 ng/g; however, there are no PALs for these compounds.

Soil borings 145-SB02, 145-SB03, 100-SB01, 157-SB01, and 157-SB02 were also included in the sampling program to evaluate potential soil impacts from Aircraft Parking Ramp (PRL 2). Monitoring wells 145-MW01, 100-MW01, and FTA-MW01 were also included in the sampling program to evaluate potential groundwater impacts from the Aircraft Parking Ramp (PRL 2). See **Sections 5.4** to **5.6** and **Tables 5-3** to **5-5** for discussion of the analytical results.

# 5.4 Building 145- Fire Station (PRL 3)

**Table 5-3** summarizes the analytical results and **Figure 5-2** shows the PFAS detection in sampling around Building 145 - Fire Station (PRL 3). PFAS were detected in the groundwater and soil samples collected.

PFBS, PFHpA, and PFHxS were detected in the groundwater samples (one parent and one duplicate) collected at monitoring well 145-MW01. PFBS was detected at a maximum concentration of 4,500 ng/L in the parent sample, below the PAL of 400,000 ng/L. PFHpA was detected at a maximum concentration of 370 ng/L and PFHxS was detected at a maximum concentration of 1,600 ng/L; however, there are no PALs for these compounds.

PFHpA, PFHxS, PFNA, PFOS, and PFOA were detected in the soil samples collected from PRL 3. PFOS and PFOA were detected at maximum concentrations of 84 ng/L and 0.64 J ng/L, respectively, below the PAL of 1,260 ng/g. PFHpA was detected at a maximum concentration of 1.2 ng/g, PFHxS was detected at a maximum concentration of 9.8 ng/g, and PFNA was detected at a maximum concentration of 0.67 J ng/g; however, there are no PALs for these compounds.

# 5.5 Building 100- Aircraft Hangar (PRL 4)

**Table 5-4** summarizes the analytical results and **Figure 5-2** shows the PFAS detection in sampling around Building 100 - Aircraft Hangar (PRL 4). PFAS were detected in the groundwater and soil samples collected.

PFHxS and PFOA were detected in the groundwater sample collected at monitoring well 100-MW01. PFOA was detected above the individual PAL of 70 ng/L at a concentration of 130 ng/L. PFHxS was detected at a concentration of 75 ng/L; however, there is no PAL for this compound.

PFHpA, PFHxS, PFNA, PFOS, and PFOA were detected in the soil samples collected from PRL 4. PFOS and PFOA were detected at maximum concentrations of 340 J ng/g and 5.2, respectively, below the PAL of 1,260 ng/g. PFHpA was detected at a maximum concentration of 1.5 ng/g, PFHxS was detected at a

maximum concentration of 3.5 ng/g, and PFNA was detected at a maximum concentration of 0.77 J ng/g; however, there are no PALs for these compounds.

Data from soil borings APR-SB01 (See **Table 5.2**), and 104-SB01 and 104-SB02 (see **Table 5.6**) were also used to evaluate PFAS presence at this PRL.

### 5.6 Building 157- Fuel Cell (PRL 5)

**Table 5-5** summarizes the analytical results and **Figure 5-1** shows the PFAS detection in the soil sampling around Building 157 - Fuel Cell (PRL 5).

PFHpA, PFHxS, PFNA, PFOS, and PFOA were detected in the soil samples collected from PRL 5. PFOS and PFOA were detected at maximum concentrations of 46 ng/g and 0.54 J ng/g, respectively, below the PAL of 1,260 ng/g. PFHpA was detected at a maximum concentration of 0.29 J ng/g, PFHxS was detected at a maximum concentration of 1.6 ng/g, and PFNA was detected at a maximum concentration of 1.6 ng/g; however, there are no PALs for these compounds.

Soil boring APR-SB04 was also included in the sampling program to evaluate potential soil impacts from Building 157 – Fuel Cell (PRL 5).

# 5.7 Building 104- Former Fire Department (PRL 6)

**Table 5-6** summarizes the analytical results and **Figure 5-2** shows the PFAS detection in the soil sampling around Building 104 - Former Fire Department (PRL 6).

The groundwater data from monitoring well 100-MW01 (see **Section 5.5** and **Table 5-4**) were used to evaluate the presence of PFAS at this PRL.

PFHpA, PFHxS, PFNA, PFOS, and PFOA were detected in the soil samples collected from PRL 6. PFOS was detected above the PAL of 1,260 ng/g in one out of four soil boring samples at a maximum concentration of 2,000 ng/g. PFOA was detected at a maximum concentration of 51 ng/g, which is below the PAL of 1,260 ng/g. PFHpA was detected at a maximum concentration of 13 ng/g, PFHxS was detected at a maximum concentration of 58 ng/g, and PFNA was detected at a maximum concentration of 8.5 ng/g; however, there are no PALs for these compounds.

# 5.8 Stormwater Discharge Point 01 (PRL 7)

**Table 5-7** summarizes the analytical results and **Figure 5-3** shows the PFAS detection in sediment sampling at Storm Water Discharge Point 01 (PRL 7).

PFHxS, PFOS, and PFOA were detected in the sediment sample collected from PRL 7. PFOS and PFOA were detected at concentrations of 4.1 ng/g and 0.40 J ng/g, respectively, below the PAL of 1,260 ng/g. PFHxS was detected at a concentration of 0.40 J ng/g; however, there is no PAL for this compound.

# 5.9 Stormwater Discharge Point 04 (PRL 8)

**Table 5-8** summarizes the analytical results and **Figure 5-3** shows the PFAS detection in the sediment sampling at Storm Water Discharge Point 04 (PRL 8).

All six PFAS were detected in the sediment samples (one parent and one duplicate) collected from PRL 8. PFOS and PFOA were detected at maximum concentrations of 18 ng/g and 0.92 ng/g, respectively, below the PAL of 1,260 ng/g. PFBS was detected at a maximum concentration of 0.63 J ng/g, below the PAL of 1.26 x 10<sup>6</sup> ng/g. PFHpA was detected at a maximum concentration of 0.75 J ng/g, PFHxS was detected at a maximum concentration of 1.3 ng/g, and PFNA was detected at a maximum concentration of 2.1 ng/g; however, there are no PALs for these compounds.

### 5.10 Base Boundary Wells

**Table 5-9** summarizes the analytical results and **Figure 5-4** shows the PFAS detection in of the groundwater sampling at the base boundary.

PFNA, PFOS, and PFOA were detected in the groundwater sample collected from monitoring well MWBP-09C. PFOS and PFOA were detected at concentrations of 58 ng/L and 14 ng/L, respectively, that are below the individual PAL of 70 ng/L; however, the combined PFOS+PFOA concentration of 72 ng/L exceeded the combined PFOS+PFOA PAL of 70 ng/L. PFNA was detected at a concentration of 1.4 J ng/L; however, there is no PAL for this compound. PFAS were not detected in the groundwater sample collected from monitoring well HFMW-46B.

Data from the new monitoring well, 100-MW01, were used to further evaluated off-base migration. As discussed in **Section 5.5**, PFOA was detected at a concentration of 130 ng/L in the groundwater sample at a concentration that exceeded the individual PAL of 70 ng/L. PFHxS was also detected at a concentration of 75 ng/L; however, there is no PAL for this compound.

## 6. Analysis of Results

#### 6.1 Soil

PFAS were detected in all of the 34 samples. Of the three compounds with PALs, PFOS was the only compound detected above the PAL and only in one sample: PFOS was detected at a maximum concentration of 2,000 ng/g in soil sample FR-104-SB01-5 from Building 104- Former Fire Department (PRL 6), which exceeds the PAL of 1,260 ng/g. PFOS, PFOA, and PFBS were not detected above the PAL in any other soil samples. PFHpA, PFHxS, and PFNA were detected in soil samples; however, there are no PALs for these compounds.

### 6.2 Groundwater

PFAS were detected in groundwater samples at each PRL and one of two base boundary wells (See **Figure 5-4**). The PFAS levels in groundwater samples exceeded the PALs for at least one constituent in two out of five groundwater samples. The highest concentrations of PFAS were detected in groundwater samples collected at the Former FTA (PRL 1). The maximum concentration of PFOA was 170 ng/L and was collected from the monitoring well located at the Former FTA (PRL 1). The anomalous groundwater encountered while attempting to install APR-MW01 appears to have changed the local groundwater gradient from the southwest to the northwest. In addition to creating a localized groundwater mound, the water that is attributable to a drinking water source has diluted the groundwater sampled at FTA-MW01, and potentially the remaining wells downgradient of this mound.

Three monitoring wells (100-MW01 [new well], FHMW-46B and MWBP-09C [both existing wells]) were used to evaluate off-base migration. PFAS were detected in two of the wells. PFOA was detected at a concentration of 170 ng/L, which exceeded the PAL of 70 ng/L. PFOA was also detected monitoring well MWBP-09C but not at a concentration that exceed the PAL. Based on the analytical results, PFOA is present at the downgradient base boundary and may be migrating off-base.

#### 6.3 Sediment

PFOS and PFOA were detected in the sediment samples collected at Stormwater Discharge Point 01 and 04 (PRLs 7 and 8) at maximum concentrations of 18 ng/L and 0.92 ng/L, respectively, which do not exceed the PAL of 70 ng/L for PFOS and PFOA.

## 6.4 Updated Conceptual Site Model

**Section 3** of this report provided the known elements of the conceptual site model (CSM) for Fresno ANGB. The subsections below provide an update of the geological/hydrogeological and surface water elements and the relationship between the surface/subsurface conditions as they relate to the PFAS results.

## 6.4.1 Geology/Hydrogeology

The information obtained from the three new shallow monitoring wells and two existing shallow monitoring well as part of this SI did not significantly change the CSM for the Fresno ANGB. Based on the soil boring results, the water bearing zone was confirmed to exist within the alluvial fan deposits approximately 113 ft bgs. The potentiometric contour map (**Figure 3-1**) that was produced from groundwater level measurements collected as part of this SI suggests the local groundwater gradient is to the northwest, in contradiction to the assumed southwesterly groundwater flow direction. Specific analysis of how groundwater flows in the deeper portion of the alluvial deposits remains theoretical since this SI did not include deeper wells.

#### 6.4.2 Surface Water

Surface water flow at the Fresno ANGB is the same as discussed in **Section 3.1**, which is generally south and southwest.

### 6.4.3 Contaminant Distribution and Impacts to Potential Receptors

Soil samples were collected at 17 locations and analyzed for PFAS. PFAS were detected in the vadose zone at all PRLs. PFOS was detected in only one of the 34 soil samples greater than its PAL. PFOS was detected at a concentration of 2,000 ng/g in subsurface soil sample FR-104-SB01-5 from Building 104-Former Fire Department (PRL 6). With the exception of this subsurface soil sample the concentrations of PFOS in soil at the other PRLs were relatively low and were significantly below the PALs. The concentrations of PFOA and PFBS in soil and sediment at all eight sampled PRLs were significantly below the PALs. PFHpA, PFHxS, and PFNA were detected at all PRLs; however, there are no PALs for these compounds. The wide range of PFAS detections in soil is more likely to be due to the ubiquity of the substances, as well as the persistence of these contaminants in the environment at low levels rather than a confirmation of a source. Thus, the potential exposure to human and ecological receptors is significantly limited based on the SI soil results since the current levels in soil, with the exception of one subsurface soil sample at Building 104- Former Fire Department (PRL 6) are below the applicable human exposure RSLs and there is not any critical habitat at Fresno ANGB.

PFAS were detected in groundwater samples collected at four sampled PRLs (attempted well APR-MW01 was intended to monitor potential impacts downgradient of Building 157 [PRL 5]), as well as the base boundary wells. The distribution of PFAS in groundwater throughout Fresno ANGB is consistent with the greatest occurrence of AFFF use and potential to be released through historical and current activities. Thus, the highest levels of PFAS in groundwater were identified at the Former Fire Training Area (PRL 1) and Building 100- Aircraft Hangar (PRL 4). The concentrations of PFAS detected in these samples may have been diluted from the leaking underground water pipeline, and thus represent a minima concentration not characteristic of the unconfined aquifer. The analytical results from the three wells located along the base boundary to the north and south indicate that PFAS may be migrating off-base and may impact at least five water wells located west of the base. Impacts to human receptors are possible based on current information.

## 6.5 Environmental Sequence Stratigraphy

#### 6.5.1 General Overview of Environmental Sequence Stratigraphy (ESS)

ESS is an EPA-endorsed, state-of—the-art investigative approach that provides a detailed understanding of the subsurface geology in order to better predict the fate and transport of contaminants at complex sites. Although originally developed in the petroleum industry to find oil and natural gas reservoirs, AECOM has successfully adapted this technology to refine CSMs. In contrast to the traditional method of subsurface correlation, which involves matching sand with sand and clay with clay, ESS depicts a detailed cross-section of sediment layering that is consistent with known depositional patterns. These cross-sections are then utilized to identify and map formations with high fluid transmissive properties.

ESS leverages all pre-existing base-wide and regional subsurface geologic data to better understand the site data within the context of the broader depositional environment. This lithologic information is then compared with established models to reveal depositional trends in the subsurface. Finally, this information is used to provide a more accurate characterization of subsurface conditions for the evaluation of potential PFC migration pathways.

### 6.5.2 Fresno ANGB Preliminary ESS Evaluation

The Fresno ANGB is located along the eastern margin of California's San Joaquin Valley (**Figure 6-1**). The San Joaquin Valley is a sediment-filled basin that is bound to the west by the California Coast Ranges and to the east by the Sierra Nevada. It is classified as a forearc basin, which basically means

that it is a basin that formed in front of a mountain range. The Valley dates back more than 65 million years ago to the Mesozoic, when subduction was taking place off the coast of California. Late Quaternary sedimentation in the San Joaquin basin consisted of episodic deposition of alluvial sediments at the valley margins, which grade basinward into a more continuous section containing a series of lacustrine deposits. By about the middle of the Pleistocene, the San Joaquin basin drainage outlet was closed or nearly closed, and the impounded drainage created a large lake (**Figure 6-2 A**), evidenced by a widespread clay unit, known as the Corcoran Clay Member of the Tulare and Turlock. Disappearance of the Corcoran Lake (**Figure 6-2 B**) was approximately coincident with, and was probably caused by, the establishment of the present Central Valley drainage outlet through the Carquinez Strait and San Francisco Bay at about 0.6 Ma). The sedimentary record of the latest Quaternary is similar to that of the middle Pleistocene, but it contains a succession of smaller pluvial lakes. **Figure 6-3** shows the stratigraphic column and lithologic distribution of the San Joaquin Valley applicable to the Fresno ANGB. A hypothetical cross-section of the San Joaquin Valley in the Fresno ANGB area would reveal a basin-fill of pre-Pleistocene marine deposits, overlain by Pleistocene lacustrine deposits and Pleistocene-Holocene alluvial fan deposits (**Figure 6-4**).

Groundwater is found in unconfined or semiconfined conditions within alluvial fans of Pleistocene to Holocene age in the eastern portion of the San Joaquin Valley which includes the Fresno ANGB. Seven water-bearing zones have been identified at different intervals in the vicinity of the Base that are largely controlled by sand derived from alluvial fans. These fan sequences reflect changes in accumulation space (Blum and Törnqvist, 2000) associated with Pleistocene glacial cycles in the Sierra Nevada and preservation space created by tectonic subsidence in the San Joaquin basin.

Adjustments in accumulation space are driven by changes in the ratio of sediment supply to discharge during glacial advances and retreats (**Figure 6-5**). At the end of glacial periods and the beginning of interglacial periods, declines in the ratio of sediment supply to discharge led to fan incision, a basinward shift in the fan intersection point, and loss of accumulation space. It is believed that extra-basinal forces associated with glacial climate cycles, along with steady basin subsidence produced a predictable distribution of sequence boundaries and depositional units. The resulting units in the fan are analogous to systems tracts described from marine deposits.

A high-resolution sequence stratigraphy in the Fresno area by Weismann and Fogg provides a framework to interpret unconformity-bounded depositional sequences in the stream-dominated Kings River alluvial fan, located near Fresno, California (**Figure 6-6**) which may be applicable for the understanding the distribution of high and low transmissive units of the Fresno ANGB (Weismann and Fogg, 2002).

While the existing cross-sections from Fresno ANGB show a general trend of sand and clay distribution in the area, they lack the predictive ability of ESS in understanding the stratigraphy within and beyond the data points. By identifying depositional cycles controlled by tectonics and periods of glaciation and non-glaciation in the Sierra Nevada, we will be able to develop a conceptual alluvial-fan sequence stratigraphic model that can identify the flow-paths of contamination through the alluvial sand units.

## 6.6 Data Quality Objectives

Additional investigation is required to further define the extent of PFAS contamination. The DQOs, by media, are outlined in **Table 6-1**.

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## 7. Conclusions and Recommendations

### 7.1 Conclusions

According to the PA Report, nine PRLs identified at Fresno ANGB warranted further investigation as part of the SI. The SI field activities for eight of the nine PRLs were completed between May 2018 and June 2018 culminating in the collection of 34 soil samples, 5 groundwater samples, and two sediment samples (plus duplicate samples) that were analyzed for six PFAS consistent with UCMR-3 (US EPA, 2012). A summary of the maximum sampling results exceeding PALs for each sampled PRL is provided in **Table 7-1**.

PFAS were present in all media sampled at each sampled PRL. Two PRLs had levels of PFAS exceeding PALs in the groundwater with the highest values recorded at the Former FTA (PRL 1). In addition, the only detection of PFAS in soil above PALs was at Building 104 Former Fire Department (PRL 6). PFAS were detected at concentrations that exceed the PALs in the well that was used to evaluate off-base migration. Based on the analytical data, it appears that PFAS could be migrating off-base due to the presence of PFAS detected in the two base boundary wells.

PFOS and PFOA were detected in the sediment samples at maximum concentrations of 18 ng/L and 0.92 ng/L, respectively at Stormwater Discharge Point 04 (PRL 8), neither compound exceeded the soil screening criteria of 1,260 ng/g. Stormwater Discharge Point 01 is an on-base outfall, whereas Stormwater Discharge Point 04 is located along the southern property boundary.

### 7.2 Recommendations

The following recommendations are provided for consideration based on the SI results:

- Further investigation at all nine PRLs is necessary to determine the nature and extent of PFAS
  contamination due to detectable levels at all eight sampled PRLs, and one PRL that could not be
  sampled during the SI field activities.
- Expand the conceptual site model such that it considers localized groundwater and surface water flow paths to select future sampling locations. To refine the CSM for Fresno ANGB, an ESS analysis could be performed to generate new cross sections. This information could:
  - o Identify and map (the composition, shape, and interconnectivity of) potentially undefined fluvial channels and other geologic features at the plume scale.
  - Construct a geologically defensible framework of the subsurface that better defines subsurface heterogeneity, accurately predicts preferential pathways, and reduces data gaps.
  - Achieve a greater understanding of groundwater and dissolved contaminant flow preferential pathways and thus target areas for active remedial implementation.
  - Reduce the number of future wells for plume measurements through stratigraphic guidance.
- Complete the delineation as part of an Expanded SI or a RI that could consist of:
  - Expanding the monitoring well network and groundwater sampling program to complete horizontal and vertical delineation of the PFAS impacts. Further groundwater evaluation is recommended at the base boundary and at all PRLs with groundwater detections.
  - Installing and sampling downgradient monitoring wells to better define the impacts of PFAS that have migrated off-base, and installation of upgradient monitoring wells to better define the impacts of PFAS that may have migrated on-base (from off-base sources).

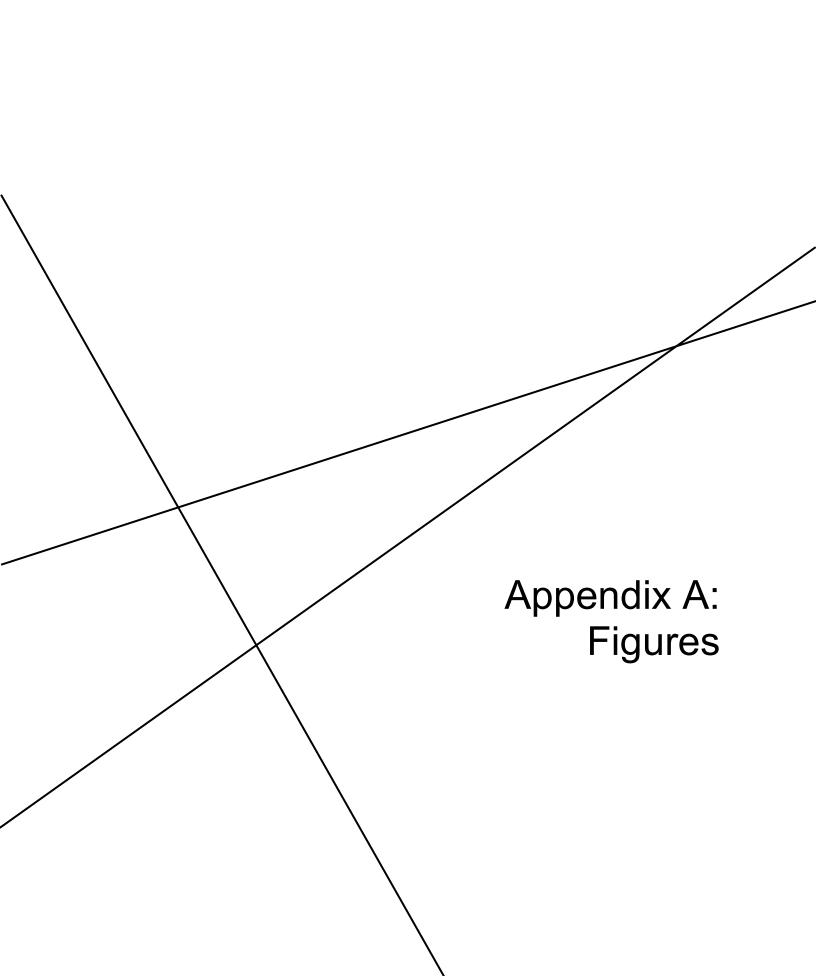
- Performing additional soil sampling and analysis of an expanded list of PFAS (in addition to the six UCMR-3 compounds) and precursor analytes to determine if significant source areas related to precursor substances are present. Precursor substances have been demonstrated to oxidize into PFOS and PFOA via biological and abiotic processes and thus could provide a lingering source of PFOS and PFOA in soil and groundwater.
- Resample existing and newly installed groundwater wells once baseline groundwater flow directions are attained as based on gauging data.
- Conducting additional sediment and surface water sampling in the Stormwater Discharge Points (PRLs 7, 8, and 9) during the winter months to address data gaps from the dry southern base boundary wells along the southern border and stormwater discharge points during the SI field work.
- Sampling the soils throughout the vadose zone from approximately 5 feet below ground surface (ft bgs) through the groundwater depth, that averaged 113 ft bgs during the SI field activities.
- Conduct preliminary site-specific risk assessment calculations in order to identify chemicals of potential concern in every media and establish preliminary remedial goals for screening.

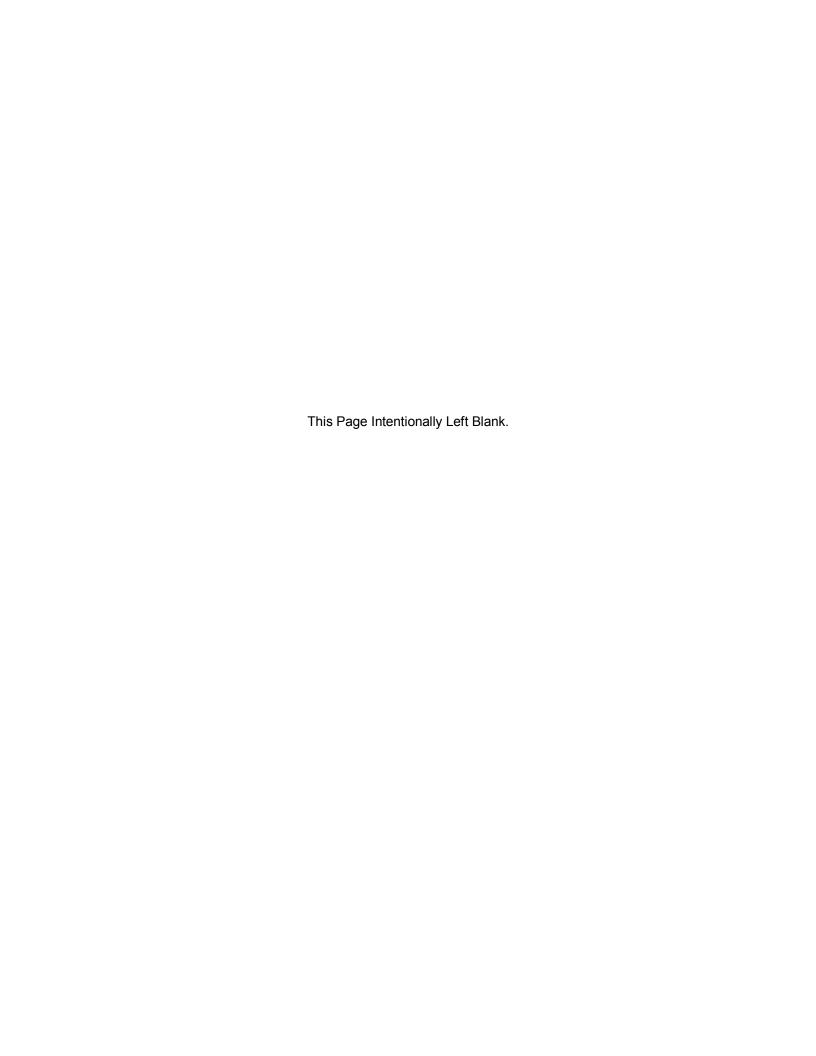
DQOs are proposed based on the results of the SI and are presented in **Section 6.5.3.** A summary of these DQOs are presented in **Table ES-2**. Additional sampling and analysis is required at each PRL not achieving a no further action status to establish the nature and extent of PFAS for each applicable media and determine if there is a complete receptor pathway. For soil, additional sampling and analysis is required to determine if a source area exists and if so, the vertical and horizontal extent for both the vadose and saturated zones.

### 8. References

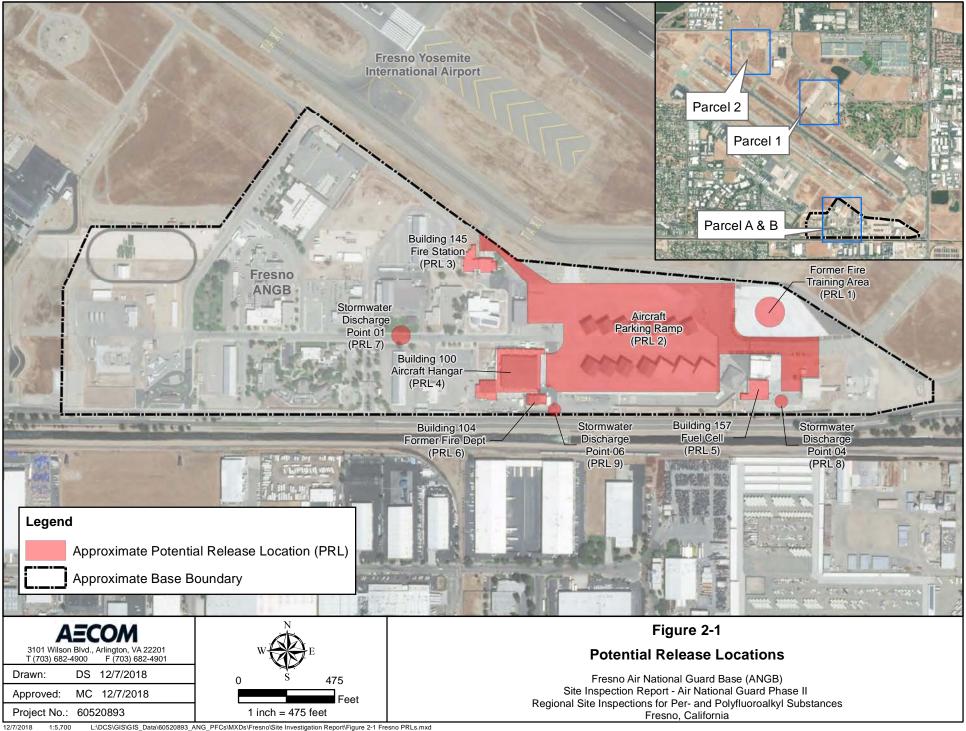
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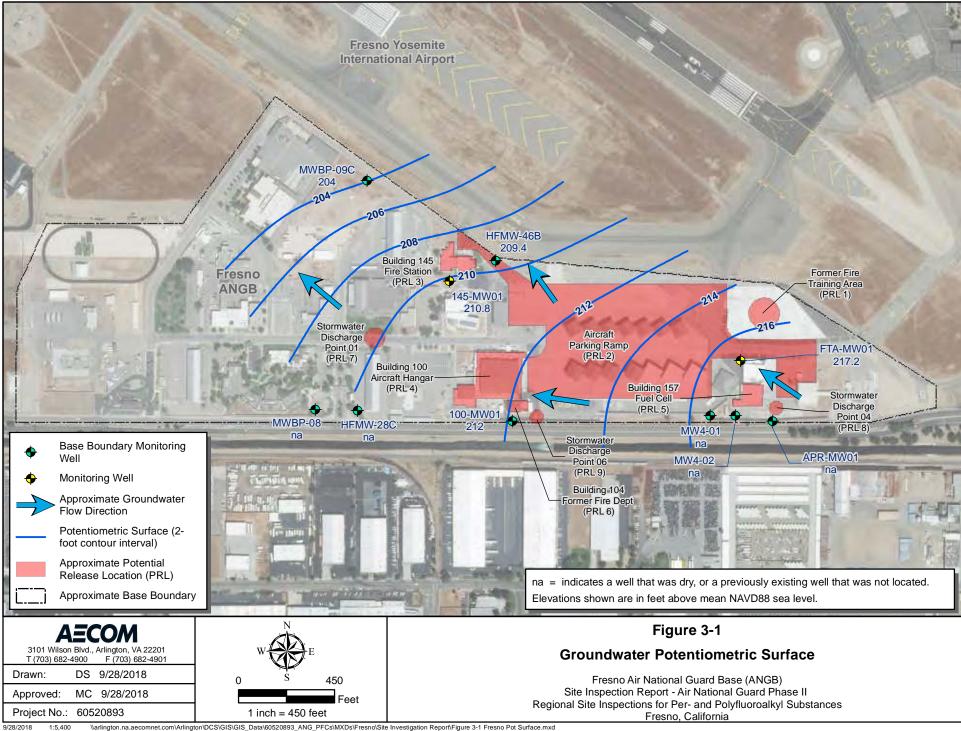
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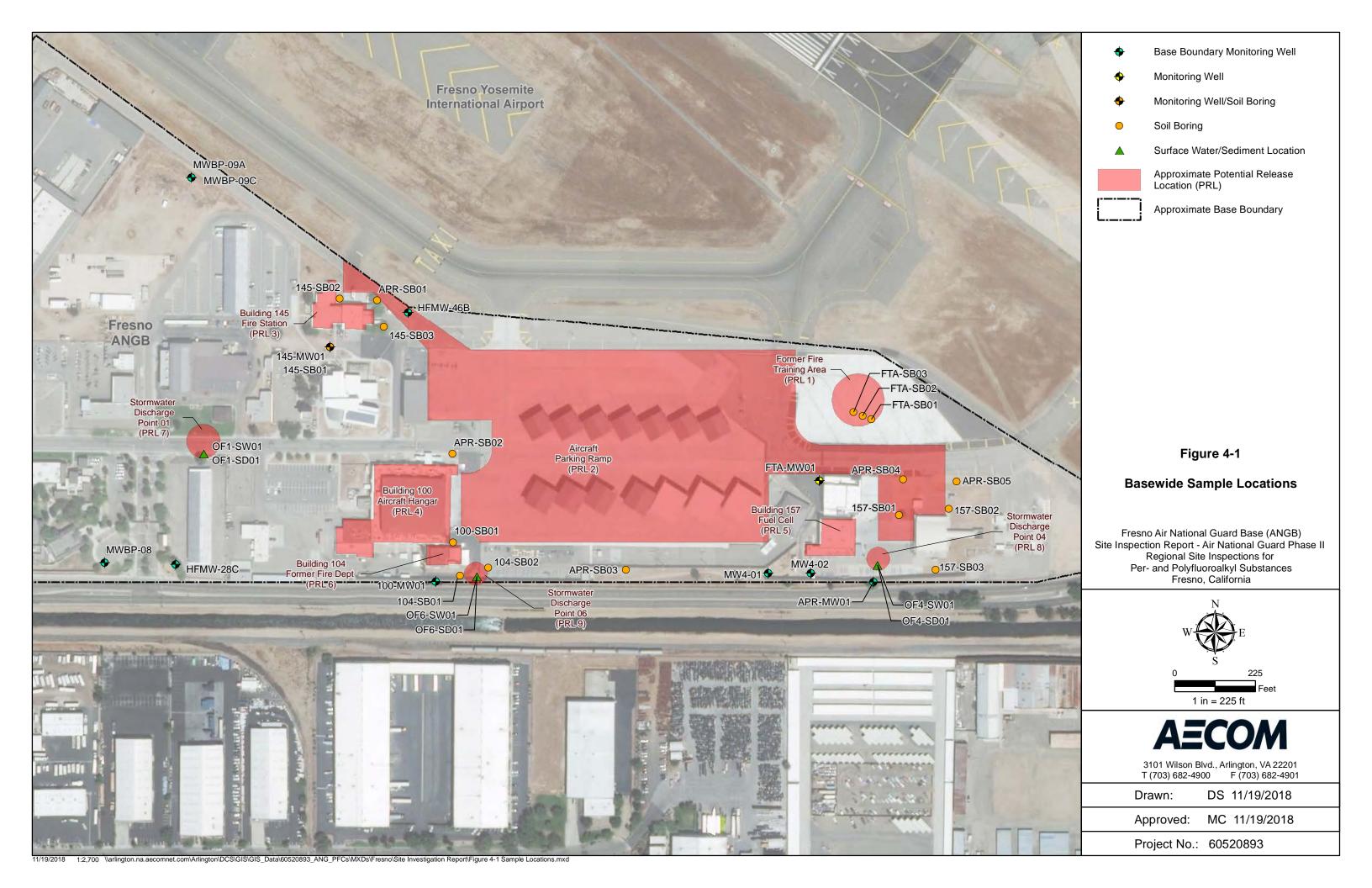


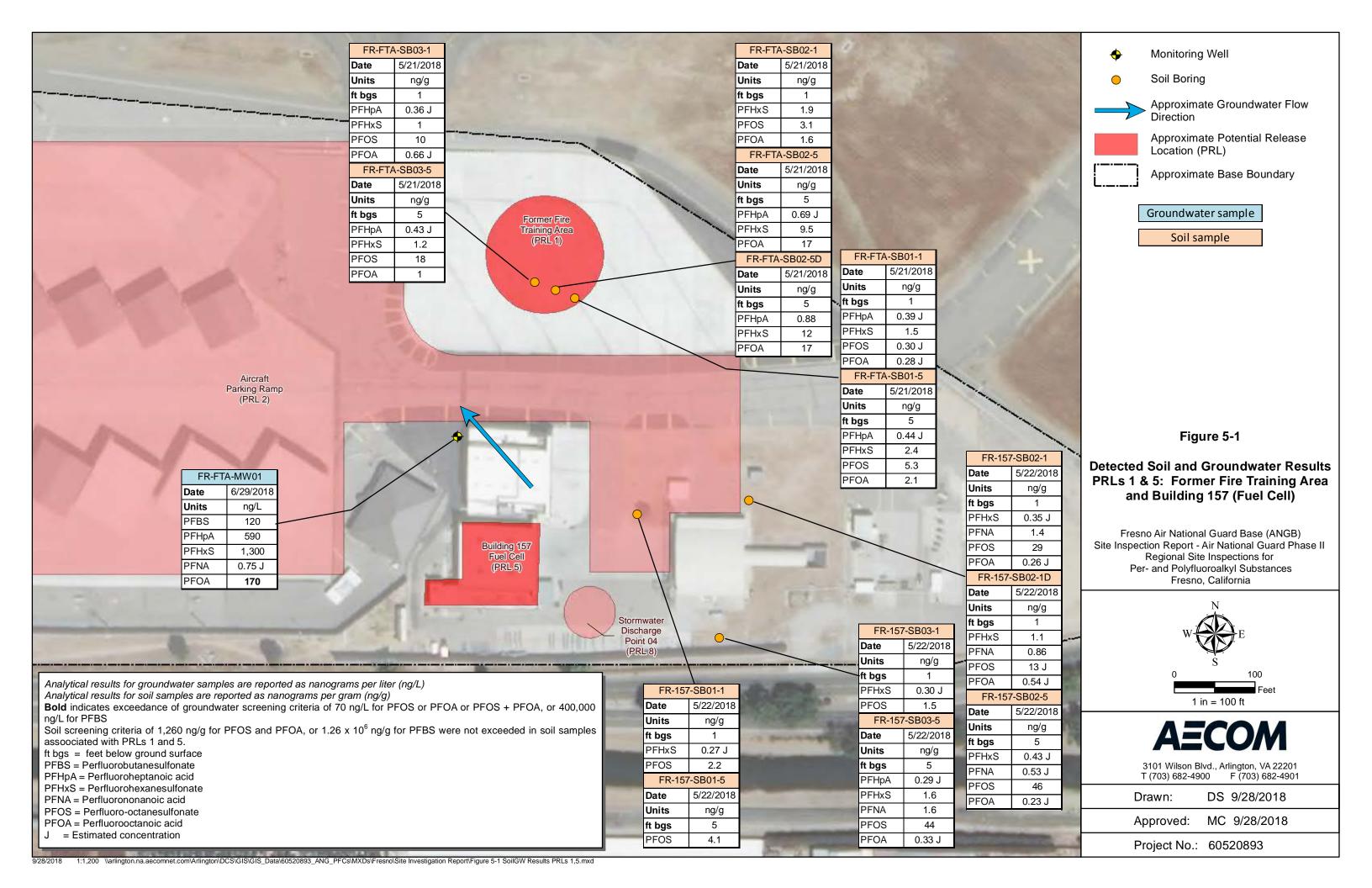


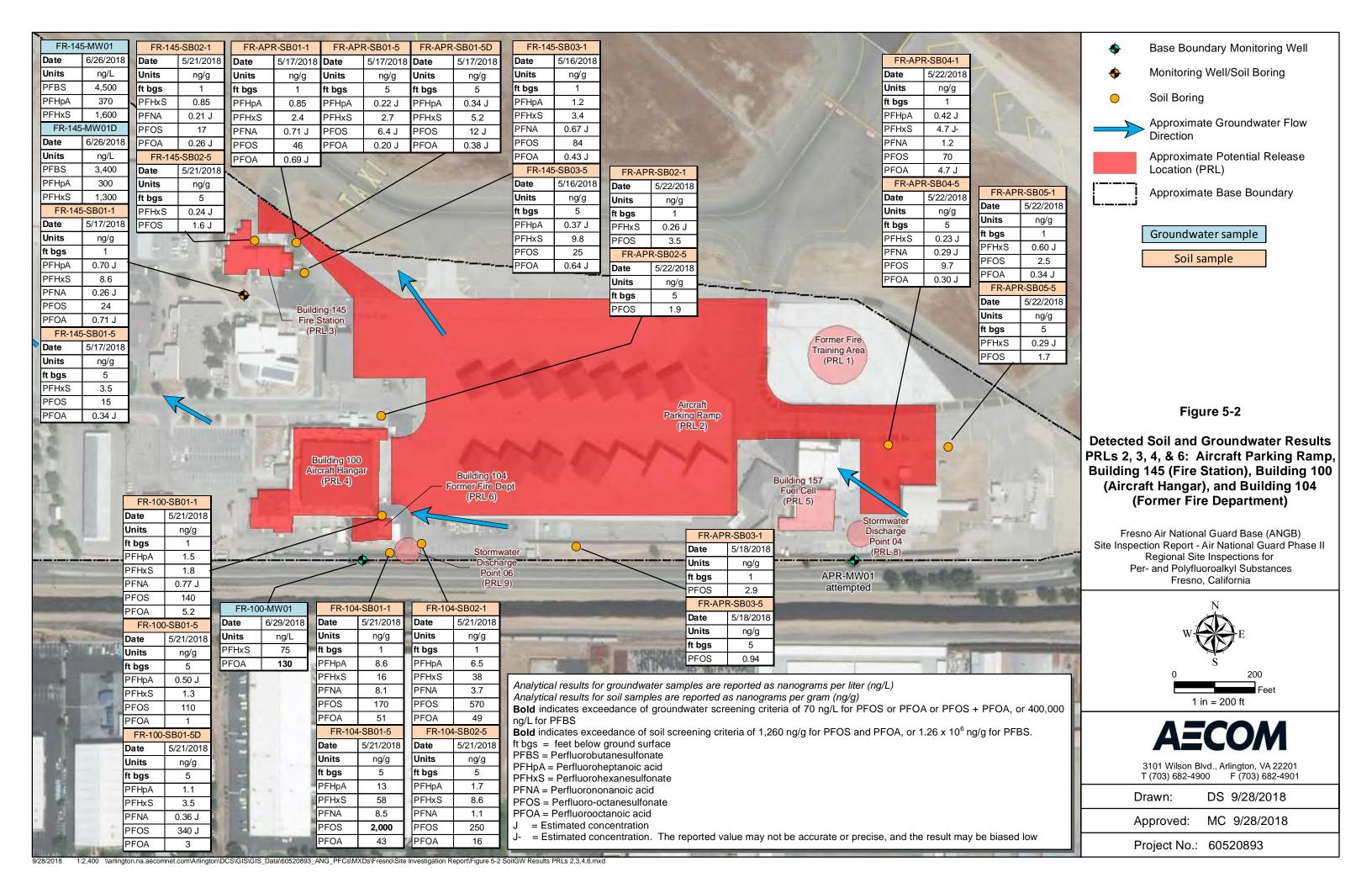


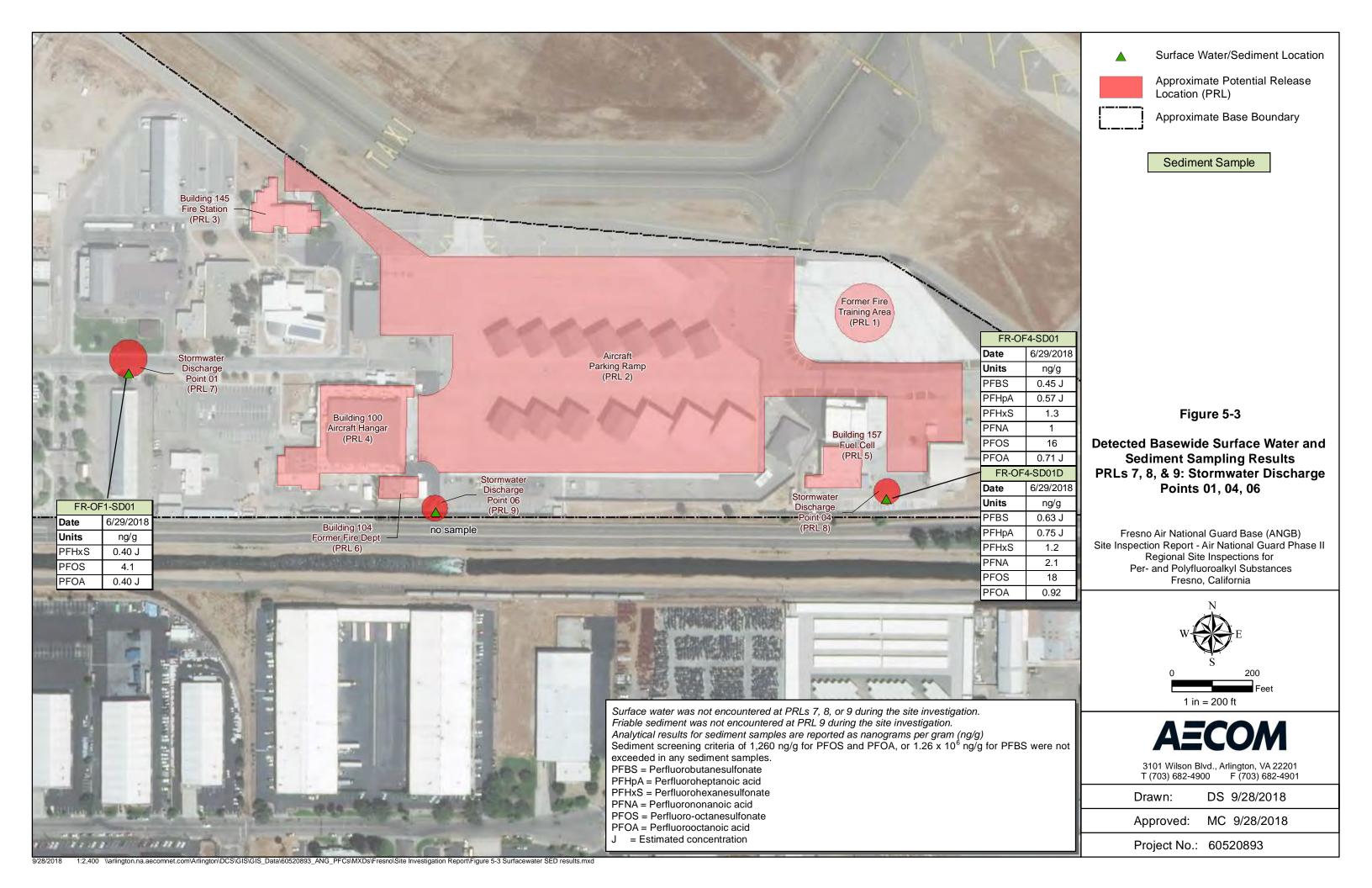


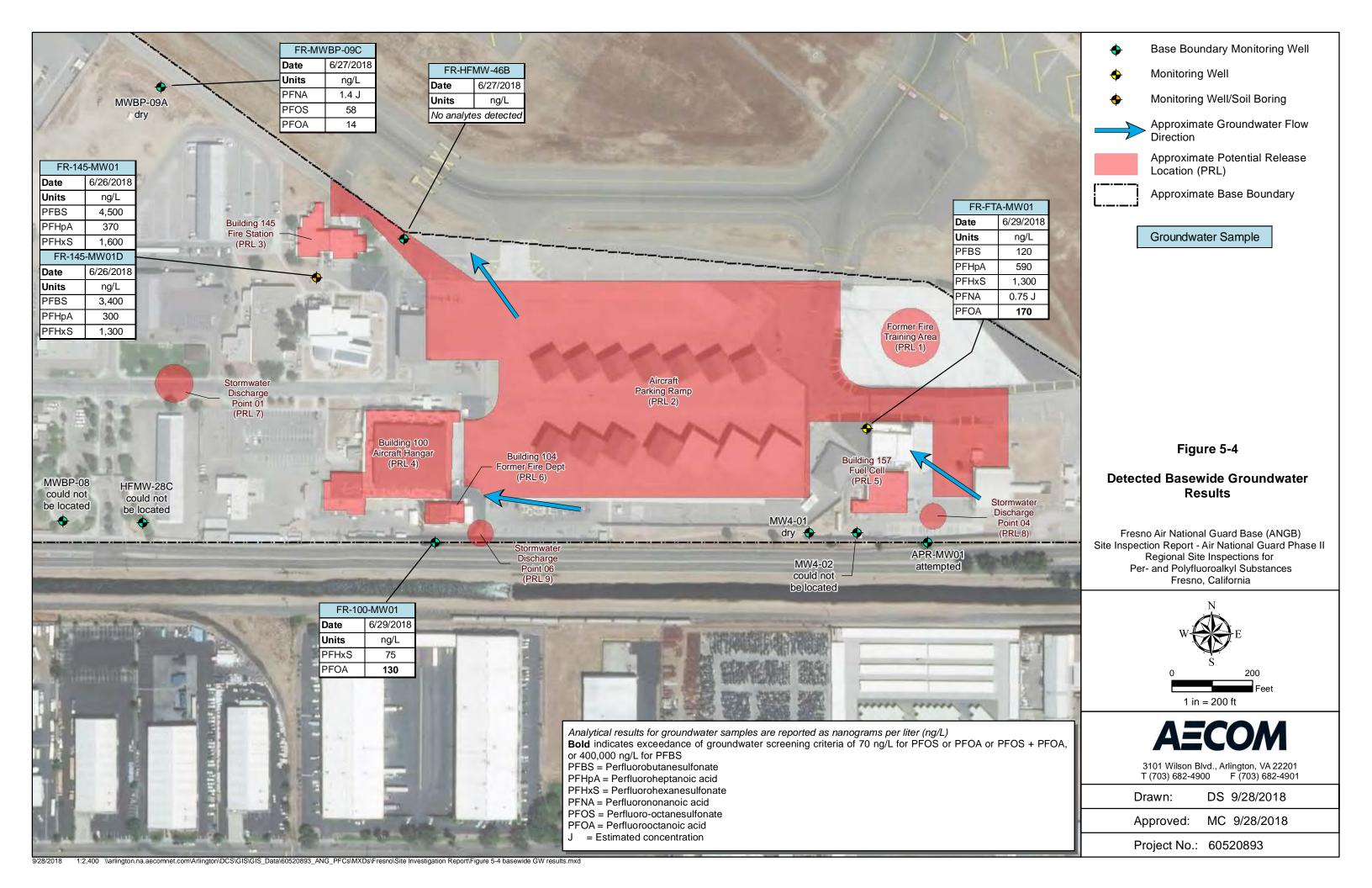


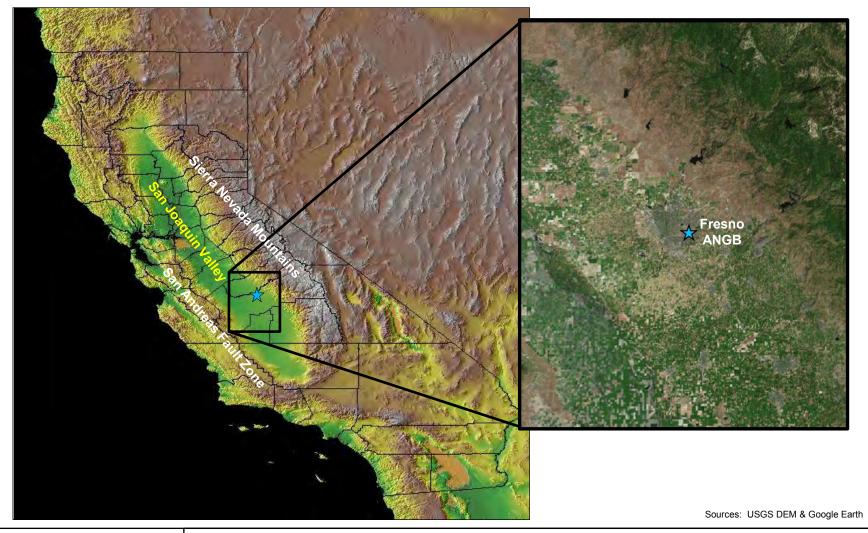












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# Figure 6-1 Regional Geomorphology



0 Fresno **ANGB** 

A) Pleistocene paleogeography of San Joaquin Valley

B) Holocene paleogeography of San Joaquin Valley

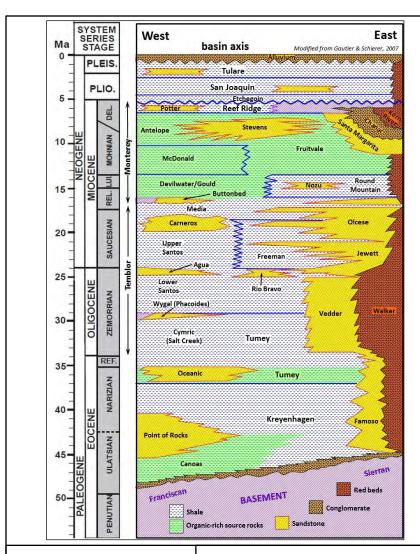
A) Formation of the Corcoran Lake during Middle Pleistocene, as evidenced by Corcoran Clay and B) subsequent infilling of the basin by alluvial fan deposits during the Holocene (after USGS Professional Paper 1501)

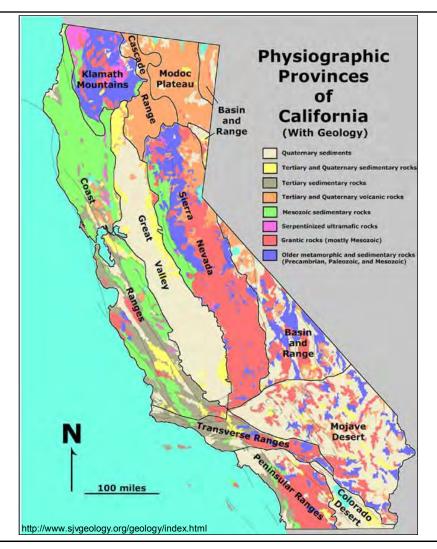
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# Figure 6-2 Paleogeography of the San Joaquin Valley





## **AECOM**

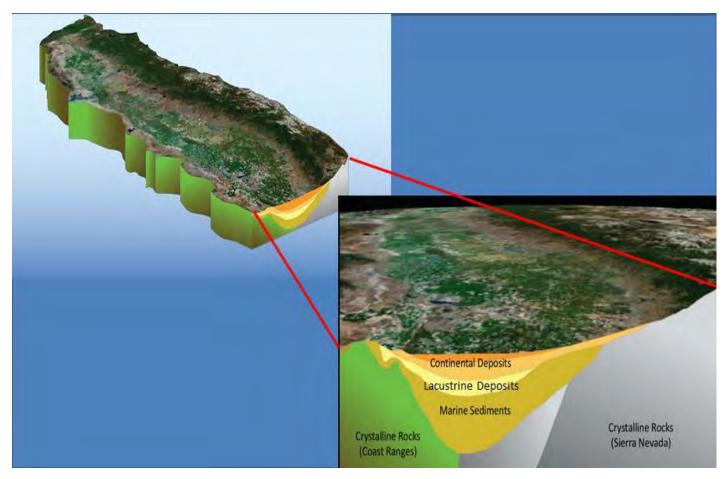
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# Figure 6-3 Stratigraphy of the San Joaquin Valley



A hypothetical cross-section drawn through the San Joaquin Valley showing the stratigraphic succession applicable for the Fresno ANGB

## **AECOM**

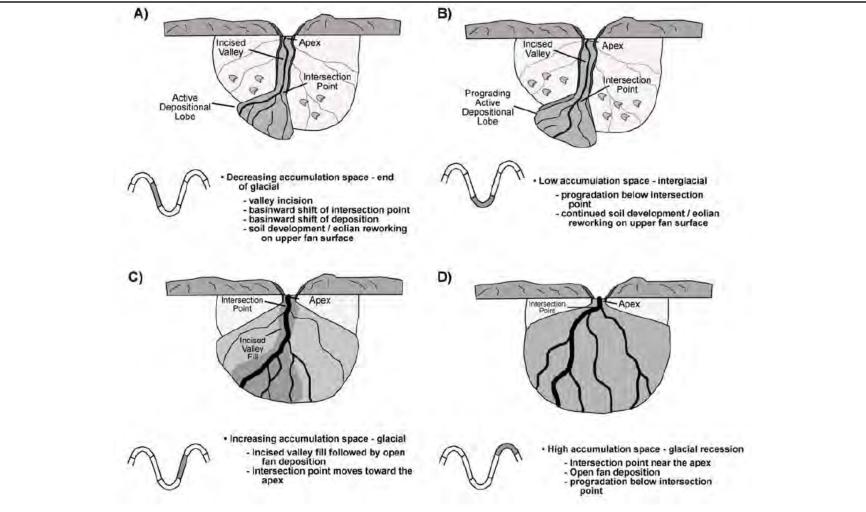
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# Figure 6-4 San Joaquin Valley Cross-section



Sequence stratigraphic controls of alluvial fans in relation to tectonically developed accommodation (after Weismann and Fogg, 2002).

## **AECOM**

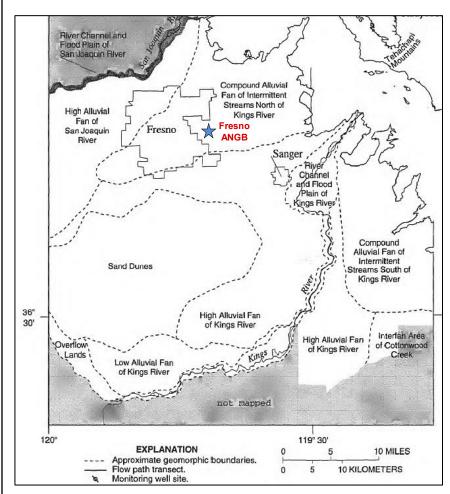
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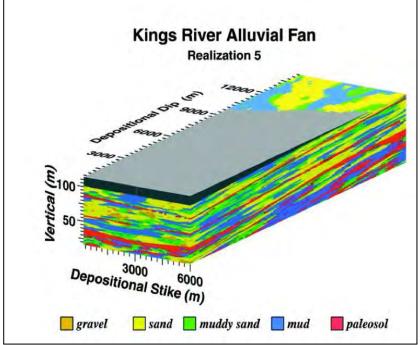
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## Figure 6-5 Alluvial Fan Sequence Stratigraphy





Sequence stratigraphic study of the Kings River Alluvial Fan near Fresno (A) shows the distribution of highly transmissive units (gravel, sand, and muddy sand) vs. low transmissive units (B) in the fan system (after Weismann and Fogg, 2002).

## **AECOM**

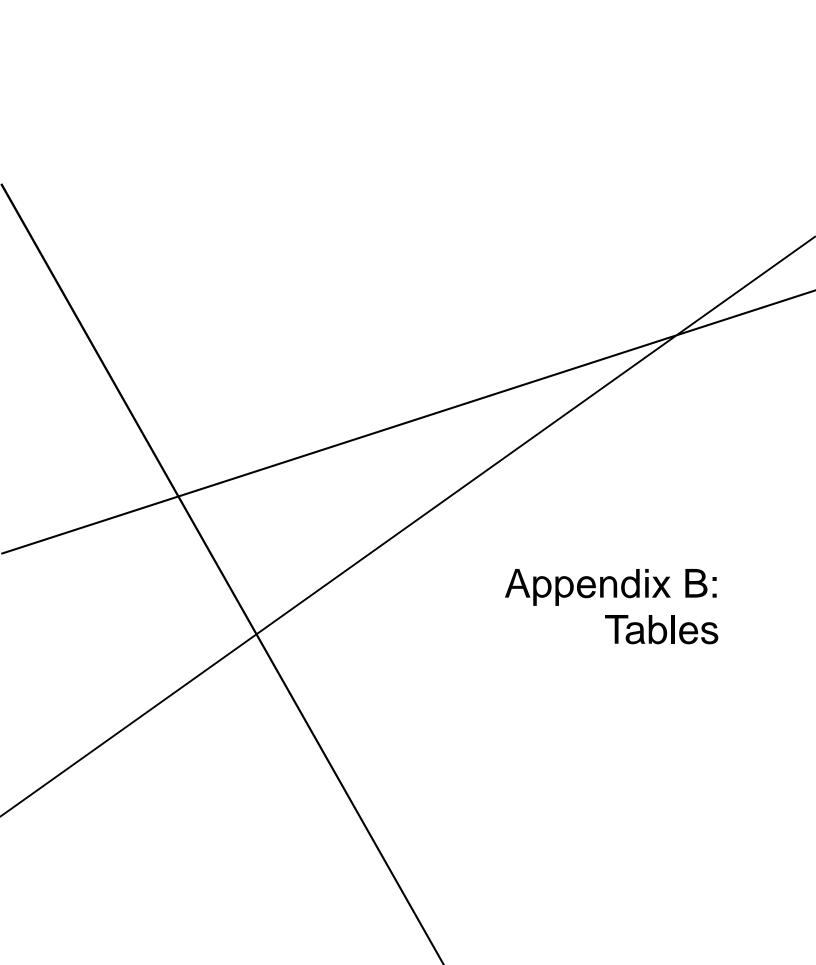
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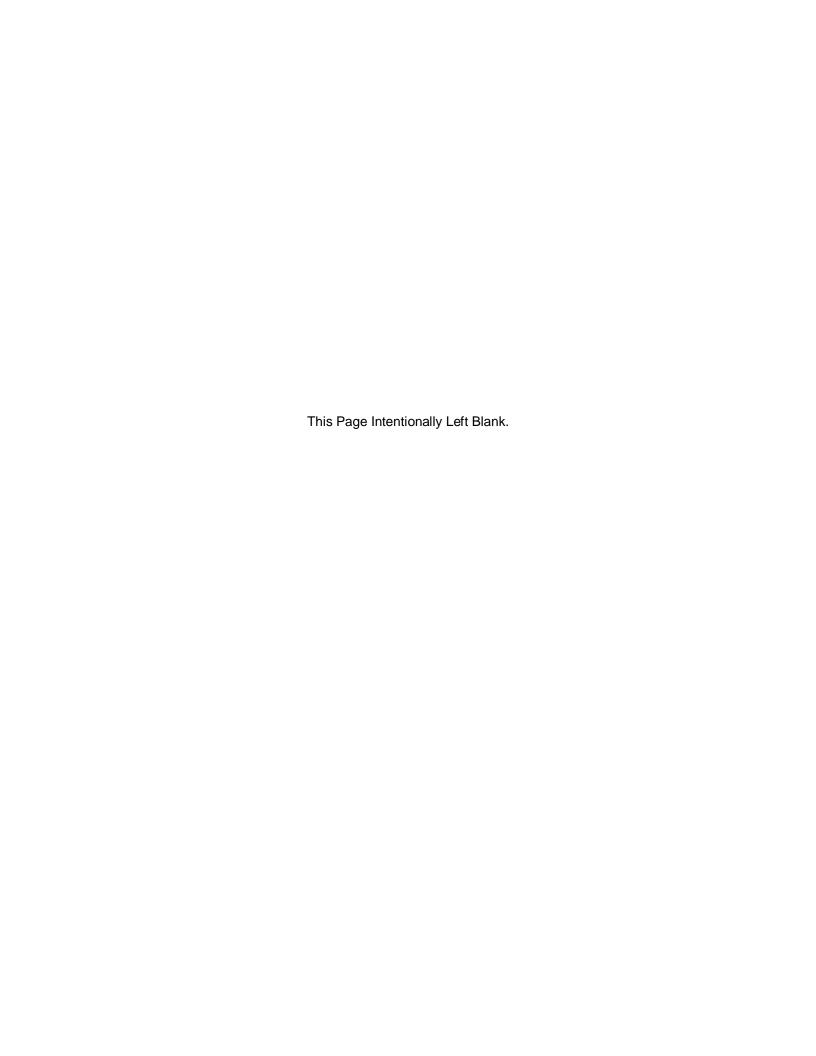
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# Figure 6-6 Sequence Stratigraphic Study of the Kings River Alluvial Fan





**Table 3-1: Water Level Summary** 

Monitoring Well	Top of Casing (ft amsl)	Water Level (ft btoc)	Water Elevation (ft amsl)
FTA-MW01	328.046	110.80	217.246
145-MW01	327.504	116.68	210.824
100-MW01	325.778	113.75	212.028
HFMW-46B	324.86	115.50	209.36
MWBP-09C	324.29	120.33	203.96
MWBP-09A	324.58	Dry	NA
MW4-01	327.61	Dry	NA

Notes:

amsl – above mean sea level btoc - below top of casing NA – Not applicable

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**Table 4-1: Monitoring Well Construction Summary** 

Location	Northing	Easting	Well Type	Ground Surface Elevation (amsl)	Well Elevation (amsl)	Screen Interval (ft bgs)	Bottom of Exploration (ft bgs)	Well Diameter (inches)
FTA-MW01	2162732.128	6355280.648	New well	328.976	328.046	111.5 – 131.5	132.8	2
145-MW02	2163097.440	6353959.539	New well	327.734	327.504	115 – 134.5	135.2	2
100-MW01	2162457.432	6354223.931	New well	325.952	325.778	113 - 133	135.0	2
HFMW-46B	2163212.17	6354170.76	Existing well	327.3ª	324.86	100-124	123	2
MWBP-09C	2163588.12	6353567.27	Existing well	326.2ª	324.29	136.5 – 146.5	157.8	2
MWBP-09A <sup>b</sup>	2163588.12	6353567.27	Existing well	326.2ª	324.58	74 – 94	102	2
MW 4-01 <sup>a</sup>	2162485.01	6355174.94	Existing well	329.4ª	327.61	71.5 – 91.5	91	2

#### Notes:

(a) - Elevation not surveyed – estimated ground surface elevation retrieved via Google Earth Pro, September 2018.

(b) - Dry Well

amsl - above mean sea level

ft bgs - feet below ground surface

Site Inspection Report Air National Guard Phase II Regional Site Inspections for Per- and Polyfluoroalkyl Substances

Fresno Air National Guard Base Fresno, California

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Table 5-1. Former Fire Training Area Sample Results (PRL 1)

-		Groundwater
Sample ID	PAL <sup>a,b</sup>	FR-FTA-MW01
Sample Date	(ng/L)	6/29/2018
Perfluorinated Compounds E	PA Method 537 Rev	1.1 modified
Perfluorobutanesulfonate	400,000	120
Perfluoroheptanoic acid	NA	590
Perfluorohexanesulfonate	NA	1,300
Perfluorononanoic acid	NA	0.75 J
Perfluoro-octanesulfonate	70	10 U *
Perfluorooctanoic acid	70	170

		Soil						
Sample ID		FR-FTA-SB01-1	FR-FTA-SB01-5	FR-FTA-SB02-1	FR-FTA-SB02-5	FR-FTA-SB02-5D	FR-FTA-SB03-1	FR-FTA-SB03-5
Sample Date		5/21/2018	5/21/2018	5/21/2018	5/21/2018	5/21/2018	5/21/2018	5/21/2018
Sample Depth (ft bgs)	EPA RSL (ng/g)	1	5	1	5	5	1	5
Perfluorinated Compounds E	EPA Method 537 Rev	1.1 Modified						
Perfluorobutanesulfonate	1.26x10^6	0.40 J	0.59 U	0.58 U	0.63 U	0.62 U	0.60 U	0.63 U
Perfluoroheptanoic acid	NA	0.39 J	0.44 J	0.65 U	0.69 J	0.88	0.36 J	0.43 J
Perfluorohexanesulfonate	NA	1.5	2.4	1.9	9.5	12	1	1.2
Perfluorononanoic acid	NA	0.67 U 0.67 U 0.65 U 0.71 U 0.71 U 0.68 U 0.71 U						
Perfluoro-octanesulfonate	1,260	0.30 J	5.3	3.1	0.68 U	0.68 U	10	18
Perfluorooctanoic acid	1,260	0.28 J	2.1	1.6	17	17	0.66 J	1

PAL = project action level

ng/L = nanogram per liter

ng/g = nanogram per gram

NA = Not applicable

D = Duplicate sample

Bold value indicates analyte detected above screening level

Italicized and bolded value indicates screening criterion used

a. United States Environmental Protection Agency (USEPA). 2016. Drinking Water Health Advisory for PFOA, PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Numbers: 822-R-16-004, 822-R-16-005. May 2016.

b.US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.

Data Qualifiers:

J = Estimated concentration

<sup>\* =</sup> Reported value changed to non-detect at elevated quantitation limit due to a blank detection

Table 5-2. Aircraft Parking Ramp Sample Results (PRL 2)

					Soil			
Sample ID		FR-APR-SB01-1	FR-APR-SB01-5	FR-APR-SB01-5D	FR-APR-SB02-1	FR-APR-SB02-5	FR-APR-SB03-1	FR-APR-SB03-5
Sample Date		5/17/2018	5/17/2018	5/17/2018	5/22/2018	5/22/2018	5/18/2018	5/18/2018
Sample Depth (ft bgs)	EPA RSL (ng/g)	1	5	5	1	5	1	5
		Perfluorinate	ed Compounds EP	A Method 537 Rev	1.1 Modified			
Perfluorobutanesulfonate	1.26x10^6	0.31 J	0.40 J	0.61 J	0.58 U	0.66 U	0.61 U	0.62 U
Perfluoroheptanoic acid	NA	0.85	0.22 J	0.34 J	0.66 U	0.75 U	0.69 U	0.71 U
Perfluorohexanesulfonate	NA	2.4	2.7	5.2	0.26 J	0.71 U	0.65 U	0.67 U
Perfluorononanoic acid	erfluorononanoic acid NA 0.71 J 0.65 U 0.66 U 0.66 U 0.75 U 0.69 U 0.71 U							0.71 U
Perfluoro-octanesulfonate	1,260	46	6.4 J	12 J	3.5	1.9	2.9	0.94
Perfluorooctanoic acid	1,260	0.69 J	0.20 J	0.38 J	0.66 U	0.75 U	0.69 U	0.71 U

		Soil					
Sample ID		FR-APR-SB04-1	FR-APR-SB04-5	FR-APR-SB05-1	FR-APR-SB05-5		
Sample Date		5/22/2018	5/22/2018	5/22/2018	5/22/2018		
Sample Depth (ft bgs)	EPA RSL (ng/g)	1	5	1	5		
Perfluorinated Compounds E	PA Method 537 Rev 1.1	Modified					
Perfluorobutanesulfonate	1.26x10^6	0.59 U	0.63 U	0.61 U	0.64 U		
Perfluoroheptanoic acid	NA	0.42 J	0.71 U	0.69 U	0.72 U		
Perfluorohexanesulfonate	NA	4.7 J-	0.23 J	0.60 J	0.29 J		
Perfluorononanoic acid	NA	1.2	0.29 J	0.69 U	0.72 U		
Perfluoro-octanesulfonate	1,260	70	9.7	2.5	1.7		
Perfluorooctanoic acid	1,260	4.7 J	0.30 J	0.34 J	0.72 U		

PAL = project action level ng/L = nan

ng/L = nanogram per liter

ng/g = nanogram per gram

NA = Not applicable

D = Duplicate sample

Bold value indicates analyte detected above screening level

Italicized and bolded value indicates screening criterion used

a. United States Environmental Protection Agency (USEPA). 2016. Drinking Water Health Advisory for PFOA, PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Numbers: 822-R-16-004, 822-R-16-005. May 2016.

b.US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.

Data Qualifiers:

J = Estimated concentration

J- = Reported value may not be accurate or precise, but the result may be biased low.

<sup>\* =</sup> Reported value changed to non-detect at elevated quantitation limit due to a blank detection

Table 5-3. Building 145 (Fire Station) Sample Results (PRL 3)

		Groundwater		
Sample ID	PAL <sup>a,b</sup>	FR-145-MW01	FR-145-MW01D	
Sample Date	(ng/L)	6/26/2018	6/26/2018	
Perfluorinated Compounds E	EPA Method 537 Rev	1.1 modified		
Perfluorobutanesulfonate	400,000	4,500	3,400	
Perfluoroheptanoic acid	NA	370	300	
Perfluorohexanesulfonate	NA	1,600	1,300	
Perfluorononanoic acid	NA	12 U	10 U	
Perfluoro-octanesulfonate	70	23 U	20 U	
Perfluorooctanoic acid	70	13 U *	11 U *	

		Soil							
Sample ID		FR-145-SB01-1	FR-145-SB01-1 FR-145-SB01-5 FR-145-SB02-1 FR-145-SB02-5 FR-145-						
Sample Date		5/17/2018	5/17/2018	5/21/2018	5/21/2018	5/16/2018	5/16/2018		
Sample Depth (ft bgs)	EPA RSL (ng/g)	1	5	1	5	1	5		
Perfluorinated Compounds	EPA Method 537 Rev	1.1 Modified							
Perfluorobutanesulfonate	1.26x10^6	1.0	0.48 J	0.58 U	0.63 U	0.48 J	1.4		
Perfluoroheptanoic acid	NA	0.70 J	0.69 U	0.66 U	0.72 U	1.2	0.37 J		
Perfluorohexanesulfonate	NA	8.6	3.5	0.85	0.24 J	3.4	9.8		
Perfluorononanoic acid	NA	0.26 J	0.69 U	0.21 J	0.72 U	0.67 J	0.67 U		
Perfluoro-octanesulfonate	1,260	24	15	17	1.6 J	84	25		
Perfluorooctanoic acid	1,260	0.71 J	0.34 J	0.26 J	0.72 U	0.43 J	0.64 J		

PAL = project action level

ng/L = nanogram per liter

ng/g = nanogram per gram

NA = Not applicable

D = Duplicate sample

Bold value indicates analyte detected above screening level

Italicized and bolded value indicates screening criterion used

a. United States Environmental Protection Agency (USEPA). 2016. Drinking Water Health Advisory for PFOA, PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Numbers: 822-R-16-004, 822-R-16-005. May 2016.

b.US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.

Data Qualifiers:

J = Estimated concentration

<sup>\* =</sup> Reported value changed to non-detect at elevated quantitation limit due to a blank detection

### Table 5-4. Building 100 (Aircraft Hangar) Sample Results (PRL 4)

-		Groundwater
Sample ID	PAL <sup>a,b</sup>	FR-100-MW01
Sample Date	(ng/L)	6/29/2018
Perfluorinated Compounds E	EPA Method 537 Rev	1.1 modified
Perfluorobutanesulfonate	400,000	1.6 U *
Perfluoroheptanoic acid	NA	3.4 U *
Perfluorohexanesulfonate	NA	75
Perfluorononanoic acid	NA	1.2 U
Perfluoro-octanesulfonate	70	8.4 U *
Perfluorooctanoic acid	70	130

		Soil					
Sample ID		FR-100-SB01-1	FR-100-SB01-5	FR-100-SB01-5D			
Sample Date		5/21/2018	5/21/2018	5/21/2018			
Sample Depth (ft bgs)	EPA RSL (ng/g)	1	5	5			
Perfluorinated Compounds I	EPA Method 537 Rev	1.1 Modified					
Perfluorobutanesulfonate	1.26x10^6	0.60 U	0.62 U	0.59 U			
Perfluoroheptanoic acid	NA	1.5	0.50 J	1.1			
Perfluorohexanesulfonate	NA	1.8	1.3	3.5			
Perfluorononanoic acid	NA	0.77 J	0.70 U	0.36 J			
Perfluoro-octanesulfonate	1,260	140	110	340 J			
Perfluorooctanoic acid	1,260	5.2	1	3			

PAL = project action level

ng/L = nanogram per liter

ng/g = nanogram per gram

NA = Not applicable

D = Duplicate sample

Bold value indicates analyte detected above screening level

Italicized and bolded value indicates screening criterion used

a. United States Environmental Protection Agency (USEPA). 2016. Drinking Water Health Advisory for PFOA, PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Numbers: 822-R-16-004, 822-R-16-005. May 2016.

b.US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.

Data Qualifiers:

J = Estimated concentration

<sup>\* =</sup> Reported value changed to non-detect at elevated quantitation limit due to a blank detection

Table 5-5. Building 157 (Fuel Cell) Sample Results (PRL 5)

		Soil						
Sample ID		FR-157-SB01-1	FR-157-SB01-5	FR-157-SB02-1	FR-157-SB02-1D	FR-157-SB02-5	FR-157-SB03-1	FR-157-SB03-5
Sample Date		5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/22/2018	5/22/2018
Sample Depth (ft bgs)	EPA RSL (ng/g)	1	5	1	1	5	1	5
Perfluorinated Compounds EP	A Method 537 Rev 1	.1 Modified						
Perfluorobutanesulfonate	1.26x10^6	0.61 U	0.61 U	0.57 U	0.58 U	0.58 U	0.61 U	0.61 U
Perfluoroheptanoic acid	NA	0.69 U	0.69 U	0.65 U	0.66 U	0.66 U	0.69 U	0.29 J
Perfluorohexanesulfonate	NA	0.27 J	0.65 U	0.35 J	1.1	0.43 J	0.30 J	1.6
Perfluorononanoic acid	NA	0.69 U	0.69 U	1.4	0.86	0.53 J	0.69 U	1.6
Perfluoro-octanesulfonate	1,260	2.2	4.1	29	13 J	46	1.5	44
Perfluorooctanoic acid	1,260	0.69 U	0.69 U	0.26 J	0.54 J	0.23 J	0.69 U	0.33 J

PAL = project action level

ng/L = nanogram per liter

ng/g = nanogram per gram

NA = Not applicable

D = Duplicate sample

Bold value indicates analyte detected above screening level

Italicized and bolded value indicates screening criterion used

a. United States Environmental Protection Agency (USEPA). 2016. Drinking Water Health Advisory for PFOA, PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Numbers: 822-R-16-004, 822-R-16-005. May 2016.

b.US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.

Data Qualifiers: J = Estimated concentration

<sup>\* =</sup> Reported value changed to non-detect at elevated quantitation limit due to a blank detection

Table 5-6. Building 104 (Former Fire Department) Sample Results (PRL 6)

		Soil						
Sample ID		FR-104-SB01-1	FR-104-SB01-5	FR-104-SB02-1	FR-104-SB02-5			
Sample Date		5/21/2018	5/21/2018	5/21/2018	5/21/2018			
Sample Depth (ft bgs)	EPA RSL (ng/g)	1	5	1	5			
Perfluorinated Compounds E	PA Method 537 Rev	1.1 Modified						
Perfluorobutanesulfonate	1.26x10^6	0.66 J	1.3	0.33 J	0.62 U			
Perfluoroheptanoic acid	NA	8.6	13	6.5	1.7			
Perfluorohexanesulfonate	NA	16	58	38	8.6			
Perfluorononanoic acid	NA	8.1	8.5	3.7	1.1			
Perfluoro-octanesulfonate	1,260	170	2,000	570	250			
Perfluorooctanoic acid	1,260	51	43	49	16			

PAL = project action level

ng/L = nanogram per liter

ng/g = nanogram per gram

NA = Not applicable

D = Duplicate sample

Bold value indicates analyte detected above screening level

Italicized and bolded value indicates screening criterion used

a. United States Environmental Protection Agency (USEPA). 2016. Drinking Water Health Advisory for PFOA, PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Numbers: 822-R-16-004, 822-R-16-005. May 2016.

b.US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.

Data Qualifiers:

<sup>\* =</sup> Reported value changed to non-detect at elevated quantitation limit due to a blank detection

Table 5-7. Stormwater Discharge Point 01 Sample Results (PRL 8)

		Sediment
Sample ID		FR-OF1-SD01
Sample Date		6/29/2018
Sample Depth (ft bgs)	EPA RSL (ng/g)	NA
Perfluorinated Compounds E	PA Method 537 Rev	1.1 Modified
Perfluorobutanesulfonate	1.26x10^6	0.57 U
Perfluoroheptanoic acid	NA	0.65 U
Perfluorohexanesulfonate	NA	0.40 J
Perfluorononanoic acid	NA	0.65 U
Perfluoro-octanesulfonate	1,260	4.1
Perfluorooctanoic acid	1,260	0.40 J

PAL = project action level

ng/L = nanogram per liter

ng/g = nanogram per gram NA = Not applicable

Bold value indicates analyte detected above screening level

Italicized and bolded value indicates screening criterion used

a. United States Environmental Protection Agency (USEPA). 2016. Drinking Water Health Advisory for PFOA, PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Numbers: 822-R-16-004, 822-R-16-005. May 2016.

b.US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.

Data Qualifiers: J = Estimated concentration

U = Not detected at concentration shown

**Table 6-1. Relevant Data Quality Objectives** 

PRL	PRL	Compounds	Sampling Recommendation(s) and Objectives
No.	Description	Exceeding PALs	
1	Former Fire Training Area	Groundwater: PFOA	Soil: Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration.
2	Aircraft Parking Ramp	<u>Groundwater:</u> PFOA	Groundwater: Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells
3	Building 145 (Fire Station)	None	Soil: Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration.  Groundwater: Although PALs were not exceeded, PFAS were detected in collected groundwater samples. Therefore, additional groundwater sampling is proposed to better define potential groundwater impacts both vertically and horizontally through the sampling of existing and additional new monitoring wells
4	Building 100 (Aircraft Hangar)	Surface Soil: PFOS Groundwater: PFOA	Soil: Additional surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the reported use of the AFFF-containing fire suppression system (FSS), documented AFFF leaks, and suspicion of an accidental release.  Groundwater: Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells
5	Building 157 (Fuel Cell)	None	Soil: Although PALs were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration.  Groundwater: Although PALs were not exceeded, PFAS were detected in collected groundwater samples. Therefore, additional groundwater sampling is proposed to better define potential groundwater impacts both vertically and horizontally through the sampling of existing and additional new monitoring wells
6	Building 104 (Former Fire Department)	Surface Soil: PFOS Groundwater: PFOA	Soil: Additional surface and subsurface soil samples to determine the nature and extent in the vertical and horizontal directions given the potential for a fire department to have soil impacts.  Groundwater: Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells
7	Stormwater Discharge Point 01	None	Surface Water and Sediment: Conduct sampling of surface water to determine if there is a complete pathway from these PRLs to the base outfalls. Conduct
8	Stormwater Discharge Point 04	None	additional sediment sampling in associated surface water runoff drainage feature.
9	Stormwater Discharge Point 06	NA	Surface Water and Sediment: Conduct sampling of surface water to determine if there is a complete exposure pathway from this PRL to the base outfalls. Conduct sediment sampling in associated surface water runoff drainage features.
	Genera	1	Groundwater: (1) Collect additional groundwater samples in upgradient locations to quantify potential impacts from upgradient sources; and (2) Collect additional groundwater samples off-base from a limited number of new monitoring wells to determine if PFAS impacts beyond the base boundary are increasing or decreasing.

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Table 7-1. Summary of SI Maximum Sampling Results Exceeding PALs

PRL			Resu	IIt Exceeding PAL	ı,b,c			
Number	PRL Name	Media	PFOS	PFOA	PFBS			
1	Former Fire Training Area	Soil	None above the PALs					
1	Former Fire Training Area	Groundwater		170 ng/L				
2	Aircraft Parking Ramp <sup>d</sup>	Soil	Noi	ne above the PAL	.S			
2	All Craft Parking Ramp	Groundwater		NS				
		Soil	No	ne above the PAL	_S			
3	Building 145 (Fire Station)	Groundwater		total was not				
				the PAL.				
4	Building 100 (Aircraft Hangar) <sup>e</sup>	Soil	Noi	None above the PALs				
7	Building 100 (Aircraft Hangar)	Groundwater		130 ng/L				
5	Building 157 (Fuel Cell) <sup>d</sup>	Soil	Noi	ne above the PAL	.s			
5	Building 157 (Fuel Cell)	Groundwater	NS					
6	Building 104 (Former Fire	Soil	2,000 ng/g					
О	Department) <sup>9</sup>	Groundwater		130 ng/L				
7	Stormwater Discharge Point 01 <sup>h</sup>	Sediment	Noi	ne above the PAL	.S			
/	Stormwater Discharge Point 01	Surface Water		NS				
0	Starrangetor Discharge Beint 04 <sup>h</sup>	Sediment	None above the PALs					
8	Stormwater Discharge Point 04 <sup>h</sup>	Surface Water		NS				
9	Starmwater Discharge Daint 06 <sup>h, i</sup>	Sediment	NO					
9	Stormwater Discharge Point 06 <sup>h, i</sup>	Surface Water	Surface Water NS					
NA	Base Boundary Wells <sup>gj</sup>	Groundwater	130 ng/L					

Table 7-1 lists the compounds that exceed the following PALs. Compounds without PALs are included in Tables in Section 5.

	Groundwater and Surface Water	Soil and Sediment
Compound	(ng/L)	(ng/g)
PFOS	70	1,260
PFOA	70	1,260
PFOS + PFOA	70	Not applicable
PFBS	400,000	1.26 x 10 <sup>6</sup>

- (a) US EPA, 2016a. Drinking Water Health Advisory for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. US EPA Document Number: 822-R-16-004. May 2016.
- (b) US EPA, 2016b. Drinking Water Health Advisory for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. US EPA Document Number: 822-R-16-005. May 2016.
- (c) US EPA, 2018. Regional Screening Levels (RSLs), May 2018. PFBS groundwater PAL based on RSL for tap water. Soil PALs calculated using the RSL calculator that are protective of a residential receptor and a THQ = 1.0.
- (d) New monitoring well APR-MW01 was attempted but not installed when anomalous, mounded groundwater was encountered. A subsequent investigation revealed the source of the water was likely an underground water pipeline that was capped but not drained. Proposed down-gradient monitoring well (APR-MW01) was intended to be "shared" with PRL 5.
- (e) Soil boring 104-SB01 is "shared" between PRL 4 and PRL 6.
- (g) Downgradient monitoring well (100-MW01) "shared" between PRL 4 [Building 100 (Aircraft Hangar)] and PRL 6 [Building 104 (Former Fire Department)]. Monitoring well 100-MW01 is located along the southern base boundary and was used to characterize groundwater impacts at the base boundary and to evaluate off-base migration.
- (h) Surface water was not present during field activities and therefore was not sampled.
- (i) Sediment was not present during field activities and therefore was not sampled.
- (j) Regional groundwater flow is southwesterly, but local groundwater flow during the SI was to the northwest

-- indicates compound was not detected above the PAL

ng/g = nanograms per gram ng/L = nanograms per liter

NA = Not applicable

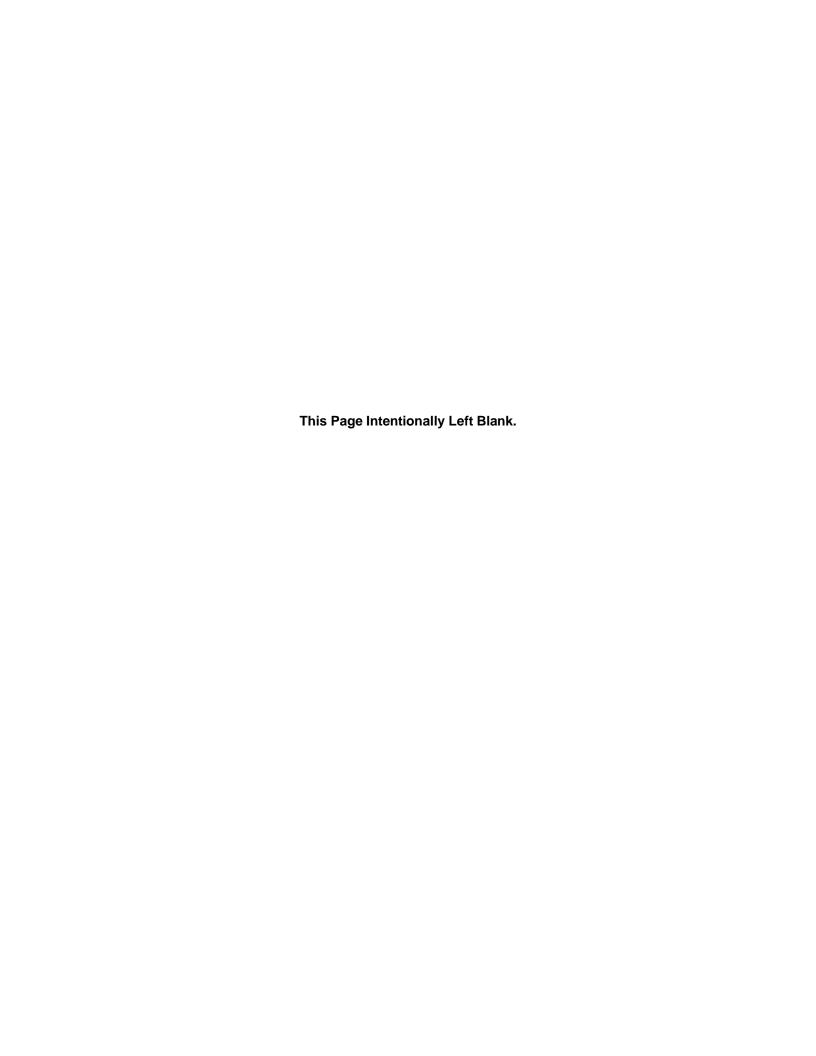
NS = Not sampled PAL = project action level PFBS = Perfluorobutanesulfonate

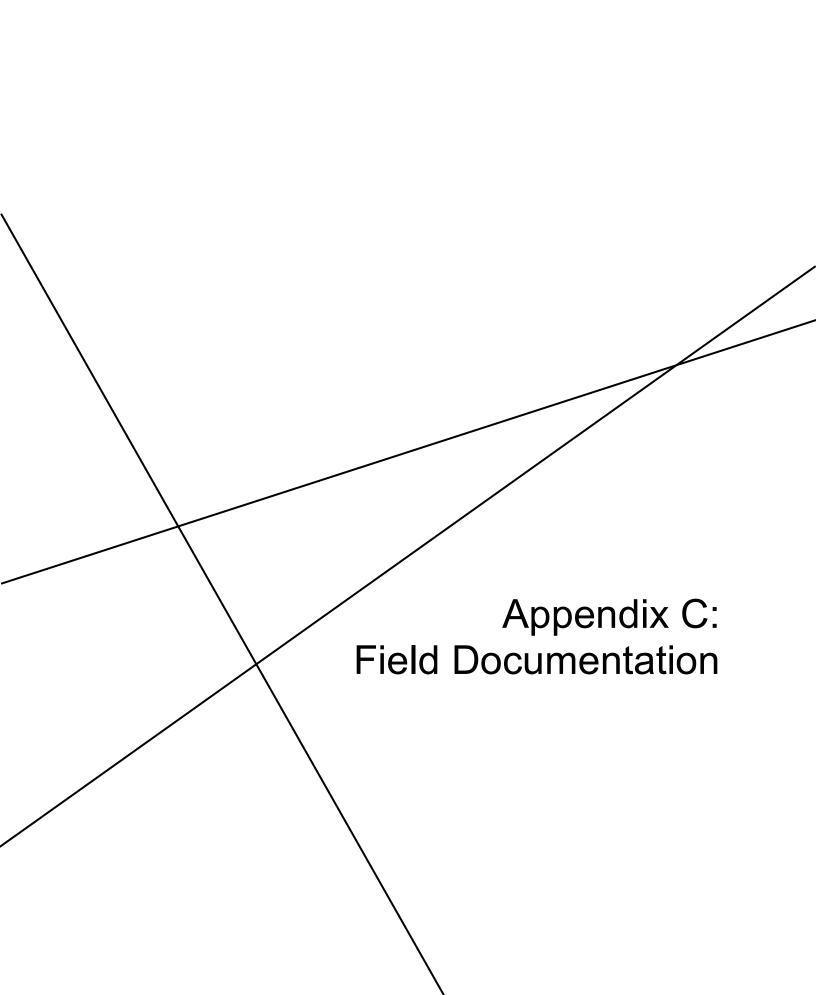
PFOA = Perfluorooctanoic acid

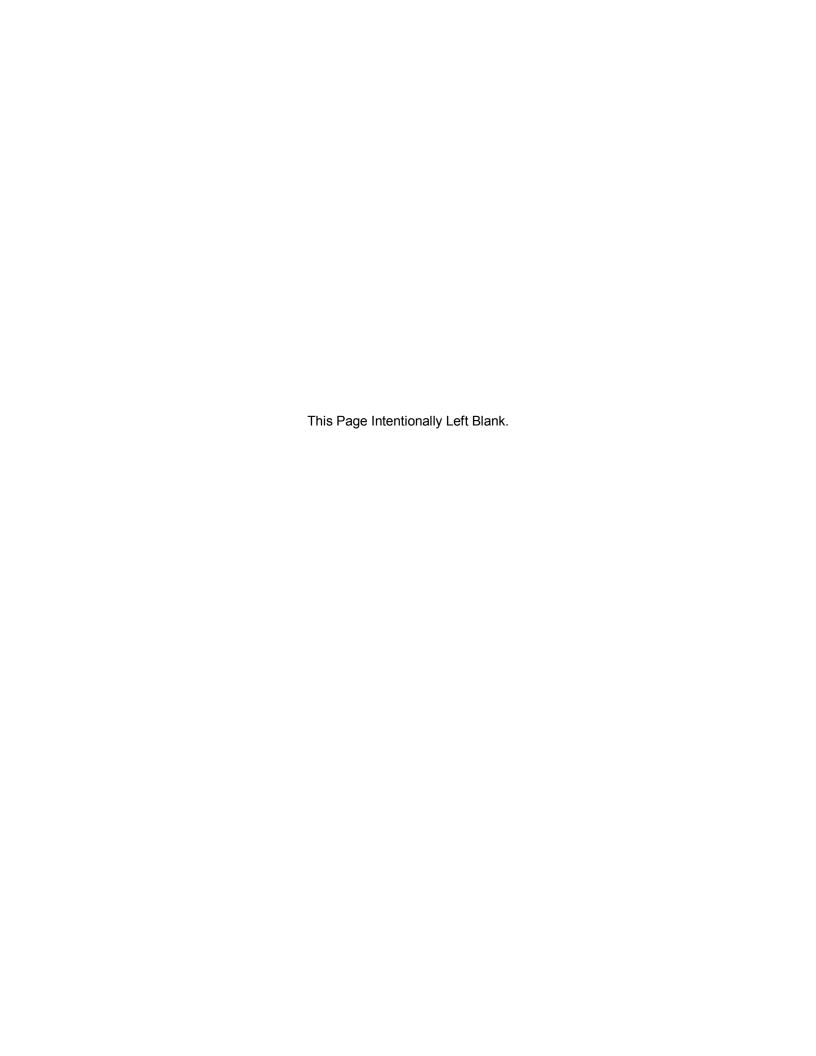
PFOS = Perfluoro-octanesulfonate PRL = potential release location

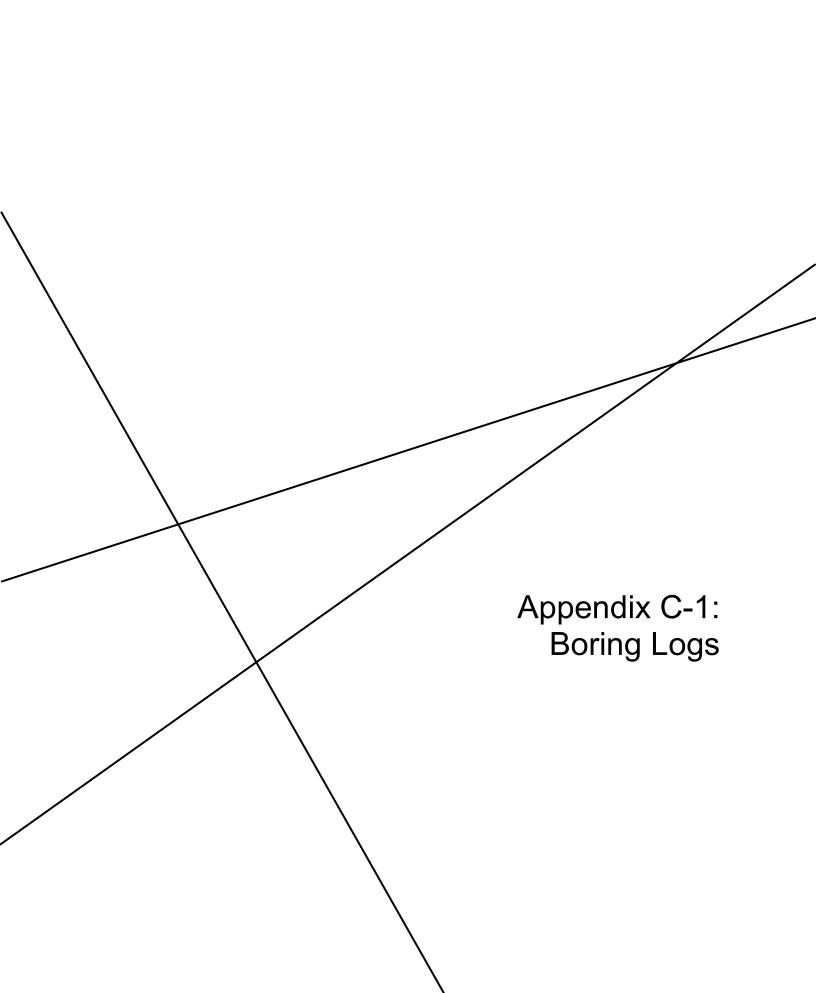
THQ = target hazard quotient

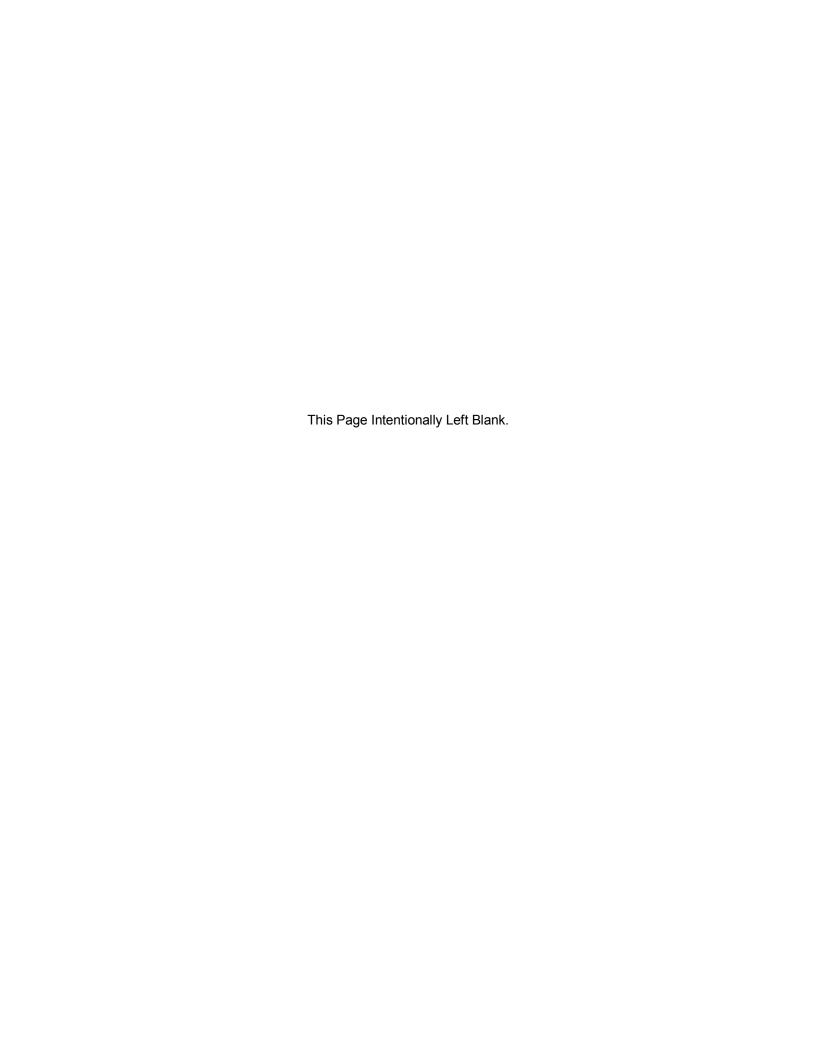
December 2018 Page B-7



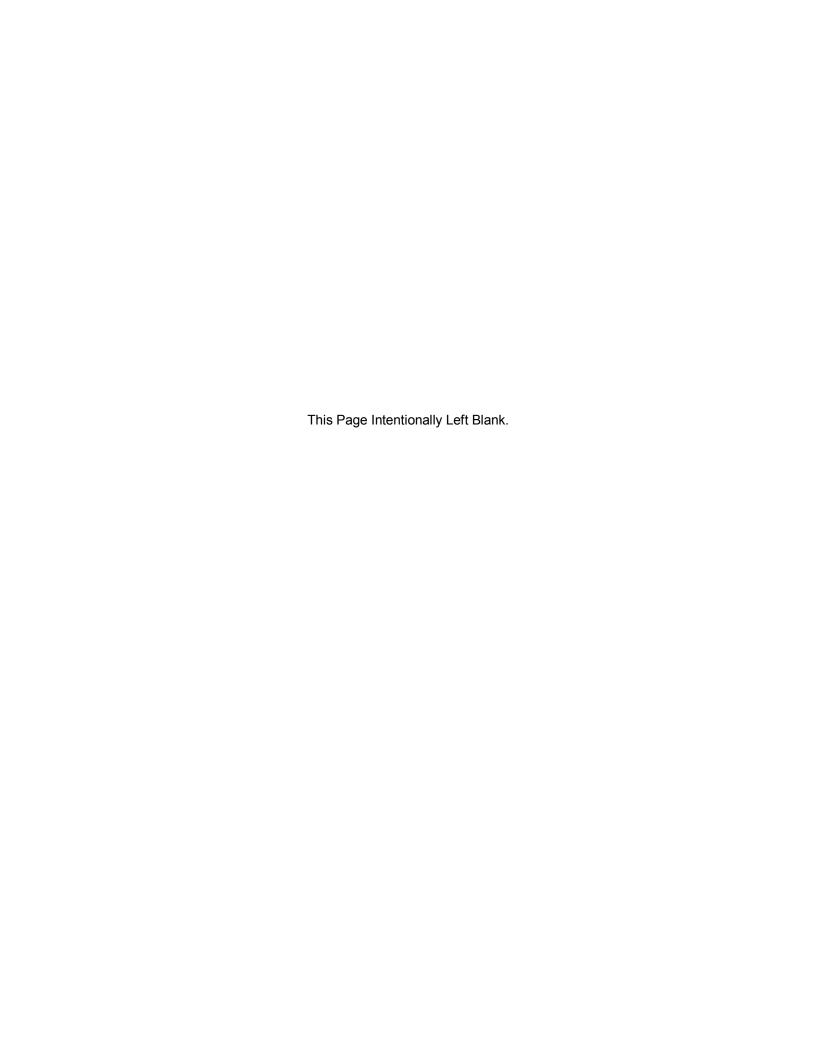








Overnight from 30 May 2018 to 31 May 2018 the field vehicle AECOM personnel had been storing field notes in was burglarized. Field notes from 14 May 2018 through 25 May 2018 were stolen. The incident was relayed to the Fresno Police Department, project management, ANG Program Manager, and the appropriate incident reporting programs immediately upon discovery. The boring logs in **Appendix C-1** were recreated by the field team.



Project Name: Fresno ANGB - PFAS SI	Site: Fre	sno AN	ΙGΒ			Hole ID: FTA-SBO1					
Project Number: 60520893.3.2	Northing:							8	Total Depth (feet): 5		
Drilling Contractor: Cascade Drilling	Easting:		33. 7/.					6	Date /	Time Started: 5.21.18	
Driller: Cesar Inzunza, Cody Hamer	Elevation	(feet M	SL):	G	roun	Date /	Time Finished: 5.21.18				
Drilling Equipment: Hand Auger	▼ Water	Depth 1	Durin	g Drill	ing (1	Date /	Time Completed:				
Drilling Method: Hand auger	Logged B	y: Dar	iel C	опеіа		Check	cd By:				
Borehole Diameter (inches): 4	Weather/Co	mments	5	inn	بظ	, (	punto	due	^ A1	m-dearn pad no Buse halvery	
USCS Description		Graphic	USCS or Rock Type	Attempted Recovered		Run Number		Time	Well Diagram	Remarks (list sample numbers here)	
Poorly Graded Sond of Stiff, dry to mist, ory to mist, ory	/silt; dark 9/2),	•	SP.	5/5	НА	f .	0.0			FR- FTA-5801-1	
Poorly Graded Sound of Stiff, dry to mist, grayish brown (10 YR (0,18, 98,0), low-resident order  TD & S'bys	~						0.0			FR- FTA- SBO1 - 5	
the control of the co						777					

Project Name: Fresno ANGB - PFAS SI	Site: Fres	no ANG	iΒ						Hole ID: FTA-5802			
Project Number: 60520893.3.2	Northing:			30.5					Total Depth (feet); 5			
Drilling Contractor: Cascade Drilling	Easting:			77.57					Date / Time Started: 5 · 21 · 18			
Driller: Cesar Inzunza, Cody Hamer	Elevation (	feet MS	L):	G	iroun	d:		Date / Time Finished: 5.21.18				
Drilling Equipment; Hand Auger	▼ Water I	Depth Di	uring	g Drill	ing (f	eet l	Date / 1	Time Completed:				
Drilling Method: Hand auger	Logged By	: Danie	el Co	пеіа	05308		Check	od By:				
Borehole Diameter (inches): 4	Weather/Con	Weather/Comments: Swry, to jets oper								today, base holday		
USCS Description		Ī					PID/FID (ppm)			Remarks (list sample numbers here)		
Poorly Graded Sord Stiff, My to most, graysh brown (1048 1016, 90,0), low-r plasticity, massive odor TD@S'bgs	( w/ silt; dark (4/9),	0, 9	5p.	4:1/5	HA		0.0		7	FR-FTA-5802-1		
and built from manager												

# Soil Boring Log

Sheet 1 of 2

Project Name: Fresno ANGB - PFAS SI	Sitc: Fres	ino Al	\GB						Hole ID: FTA-5803		
Project Number: 60520893.3.2	Northing:									Depth (feet): 5	
Drilling Contractor: Cascade Drilling	Easting:								Date / Time Started: 5.21.18		
Driller: Cesar Inzunza, Cody Hamer	Elevation (	feet M	ISL):	G	iroun	d:			Date / Time Finished: 5.21.18		
Drilling Equipment: Hand Auger	▼ Water I	Depth	Durin	g Drill	ing (	feet i	Date /	Time Completed:			
Drilling Method: Hand auger	Logged By	r: Dau	niel C	orreia		Check	ed By:				
Borehole Diameter (inches): 4	Weather/Comments: Skry, base holida								٠ ٢	no jets	
thood (150) USCS Description		Graphic	USCS or Rock Type	Attempted Recovered		Run Number m	oles (mdd)	Time	Well Diagram	Remarks (list sample numbers here)	
Poorly braded Soul w 2. Stiff, dry to moist, i grayish brown (1042 4)	u/silt; Lark 12),		SP-	4.1	на	3.		U.O		FR-FTA-5803-1	
5 plasticity, massive,								0.0		FR-FTA-5803-5	
TD @ S' 6-95		٠						is a second			
15					THE REST OF THE RE						
28										Form: 06-BLANK LÖ	

By (	5.EC	KE KE	RT Chec	ked by	e.	Drilli	ng Conti	ractor Hung	CASCADE	BORING LOG
DATE	ATION C	OF BOR WELL ON OF	NG C	~	NOW Y	Previous Freshelle Fred Am B-Mal ELEVATION	A Are	N. Clavis Are	JOB NUMBER 60520893.3.2 E  DRILLING METHOD: LAR CME 8" O.P. hollow stem agos  SAMPLING METHOD: 1.5' Split spece 9 feet	TA-MW TANGE  75 BORING NUMBER  FTA-MWOL  SHEET  OF U
SAMPLER	PEET ORIVEN FEET RECOVERED	TIME	SAMPLE DEPTH	BLOWS/FT. SAMPLER	SAMPLE T	SAMPLE NUMBER	DEPTH (feet)	SOIL GRAPH	surface conditions: Applied a project over air knilled close	12 locain 1309 0815 5/21/18 5/31/8
	555					NUMBER	0 1 2 2 3 4 5 5 6 6 7		Closed by ar anthroom love (SM), we will have dry, no	y-10
	///////////////////////////////////////	4	45				8 7			
							10/			

LOCA	ATION C	FB R	N Z.	00/	P2 1				JOB NUMBER	LOCATION	
			)		()				DRILLING METHOD:		BORING NUMBER  - M WOL  SHEET
									SAMPLING METHOD:		2 01 14
DATL		,	,			ELEVATIO	N				DRILLING
SAMPLER	FEET DRIVEN FEET RECOVERED	TIME	SAMPLE DEPTH	BLOWS/FT. SAMPLER	SAMPLE 3	SAMPLE NUMBER	DEPTH (feet)	SOIL GRAPH	SURFACE CONDITIONS		START TIME FINSH TIME DATE DATE
22	1.5	1315			9,0			SM		men vie	
							/1	ML	Grayish brown, 104 dense, dry, no oler sold (0, 29, 75, C	(45/d, 51L) or stemmy,	very fre
							12				
	7						13		Internel Gulact		
	7					_	14		STOP WARK CO	1320 Ju	eto
JJ	1,5	1495					15	sP.	START WORKE	1420 10426/2, f	he poorly
<i>J</i> v	, 15				0,0		16	. 1	START WORKE light brounish gray, graded SAND, dens starily (0,100,0,0) light olive brown well scaled SAND, stainly (0,100,0)	2545/3, f	the to compe
							17-	Sw	well scaled SAND, striking (0,100,0)	dewe, In,	he other or
							18				
							19				
							20			<del></del>	

By CFE
Date 5/29/18 Checked by Drilling Contractor **BORING LOG** LOCATION OF BORING See pg 1 JOS NUMBER BORING NUMBER DRILLING METHOD: FTA-MVOI SAMPLING METHOD: DATUM ELEVATION DRILLING GRAPH SURFACE CONDITIONS: SAMPLE NUMBER DEPTH (feet) 20 SW color chage to: olive from, 2944/3 5 1.5 1435 00 21 22 23 Inferred contact 2 4 0.0 27 28 29 30

40

By <u>(兄</u>を Date <u>与/かん</u> Checked by **BORING LOG** LOCATION OF BORING
See 17 JOB NUMBER BORING NUMBER DRILLING METHOD: FTA-MWOL SAMPLING METHOD: DATUM **ELEVATION** DRILLING FEET DAIVEN FEET RECOVERED PID GRAPH SURFACE CONDITIONS: SAMPLE NUMBER DEPTH (feet) 40 15 3505 ML 0.0 41 42 Interned contract 43 44 Strong brown, 7.54R4/6, file to coarse well graded SAND, deure, with no order or stalling, (0,100,0,0) 45 55 1510 0.0 46 47 48 Infered Contact 49 50

**Drilling Contractor** 

70

79

80

By (PE)
Date 5/29/18 Checked by \_\_\_\_ Drilling Contractor **BORING LOG** LOCATION OF BORING See po JOB NUMBER BORING NUMBER DRILLING METHOD: FTA-MWOI SAMPLING METHOD: **ELEVATION** DATUM. FEET DRIVEN FEET RECOVERED GRAPH SURFACE CONDITIONS: SAMPLE NUMBER DEPTH (feet) 900 0,0 92 93 9 4 End drilling operation for 5/39/18@1720

ML Contract Inling operation on 5/30/18@1000

incressly said: (0,30,70,0) 0.5 1015 96 97 Interes out et 98 99 100

By CP\_E Drilling Contractor \_\_\_\_\_\_

Date 5/30/18 Checked by \_\_\_\_\_ **BORING LOG** LOCATION OF BORING 500 19 JOB NUMBER DRILLING METHOD: SORING NUMBER FTA-MWOL SHEET SAMPLING METHOD: DATUM ELEVATION DRILLING TART FIME FIMISH TIME PID GRAPH SURFACE CONDITIONS: SAMPLE DEPTH NUMBER (feet) gray, 1046/1, well graded ned, in to contre SAND, median deve, noist, no obr orstray (0,100,0,0) 100 (5) 030 141 102 103 104 No fearery from 109.0 to 106.9, drills of like sand catcher to an III a recovery from split spoon going formard 105 55 1.50 1040 106 107 08 109 110

By <u>CPE</u>

Date <u>5/30/18</u> Checked by \_\_\_\_ **Drilling Contractor BORING LOG** LOCATION OF BORING See pg 1 JOB NUMBER BORING NUMBER DRILLING METHOD: ETA-MWOIL SAMPLING METHOD: DATUM **ELEVATION** GRAPH SURFACE CONDITIONS SAMPLE NUMBER DEPTH (feet) ISW color chaze to: olive, 5/4/3 15 1090 ML fork yelland from, 104k4/4, sondy SLT, fusal, deare, word, to ober or string (0, 40, 60,0) 112 113 Intered first depth to water 115 WET 116 117 118 119 120

BORING NUMBER FTA-MWOL of 14 BM 55 1.0 0805 Look yellowik brown 104k4/6, sonly 57LT, ML, fre sonly, still, net, no olar or stonly, (0,35,65,0)

T. D: 1320 625-ahore awar to 1335/55

to over JM split spoon sorph intered 131 0815 T.D: 132.8'55 134 135 136 137 138 139 140

# Soil Boring Log

Sheet 1 of 2

Project Name: Fresno ANGB - PFAS SI	Site: Free	sno AN	IGB						Hole ID: 145-5801		
Project Number: 60520893.3.2	Northing:	8							The case	Depth (feet): 5	
Drilling Contractor: Cascade Drilling	Easting:								Date / Time Started: 5-16-18		
Driller: Cesar Inzunza, Cody Hamer	Elevation	(feet M	ISL):	C	iroun	d:			Date / Time Finished: 5-16-19		
Drilling Equipment: Hand Auger	▼ Water	Depth l	Durin	g Drill	ing (I	Date /	Time Completed:				
Drilling Method: Hand auger	Logged By	y: Dar	uiel Co	orreia		Check	ced By:				
Borchole Diameter (inches): 4	Weather/Co	Weather/Comments:									
	l,	Lo	g		S	amp	oles		E	300	
USCS Description	ı,	Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)	
Sond, Poorly grad Lry, Lork yellowsh (10 th 4/4), (0, 5, 99 Low plasticity, bloc odor	ed, stiff, brown i,0), key, ro		SP	5/5	wa Ak					FR-145-5801-1  FR-145-5801-5  Hard auger from 0-5' bys 18' cheet suit sample, contact or clear borned u are krife toll 10' bys	
					0.00 M 1.00 M 1.						

Project Name: Fresno ANGB - PFAS S	Site: Free	sno AN	IGB			Hole ID: 145-5802					
Project Number: 60520893.3.2	Northing:									Depth (feet): 5	
Drilling Contractor: Cascade Drilling	Easting:							1	Date / Time Started: 5-17-18		
Driller: Cesar Inzunza, Cody Hamer	Elevation	(feet M	ISL):	C	iroun	d:		Date / Time Finished: 5-17.19			
Drilling Equipment; Hand Auger	▼ Water	Depth 1	Durin	g Drill	ling (	feet l	Date /	Time Completed:			
Drilling Method: Hand auger	Logged By	y: Dar	uel C	orreia		Check	ed By:				
Borehole Diameter (inches): 4	Weather/Co	nments	S:								
USCS Descript	ion	Graphic	USCS or Rock Type	Attempted		Run Number me	ples (mdd)	Time	Well Diagram	Remarks (list sample numbers here)	
Poorly graded Son Stiff, moist, Only brown (10 YR4/6), moist, Only brown (10 YR4/6), moist, only most odar, roots  TO @ 5' base	ud; very c yellowsh. (0,5,95,0)		54	5/5	нА		0.0			FR-145-5802-1	
Diginal copies of logs were stolen from field vehicle the	assive,						0.6			FR-145-5802-5	
<b>₽</b>											
Pare built from months											

Project Name:	Fresno ANGB - PFAS SI	Site: Fres	no AN	IGB				Hole ID: 145-5803				
Project Number:	60520893.3.2	Northing:								Total Depth (feet): 5		
Drilling Contrac	tor: Cascade Drilling	Easting:								Date / Time Started: 5.16.18		
Driller: Cesar In	zunza, Cody Hamer	Elevation (	feet M	ISL):	C	roun	d:		Date / Time Finished: 5.18.18			
Drilling Equipme	ent: Hand Auger	▼ Water I	Depth	Durin	g Drill	ing (	feet l	ogs):	Date / Time Completed:			
Drilling Method:	Hand auger	Logged By	; Dar	riel Co	опеіа	1000			Check	red By:		
Borehole Diamet	er (inches): 4	Weather/Con	ruments	E					*			
		, , ,	Lo	g		S	amı	oles		E		
Depth (feet)					Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)	
Original Copies of Low	y crosed son , dry, Lark yell , 10 yr 3/6), 10,5, plasticity, mass	25,0),		se	5/5	НΑ		0.0			FR-145-5803-1	
stolen from		stue,			0 0 s		j	0.0			FR-145-5803-5	
Tield vehicle these are bui						** ***********************************		200				
are built from memory.		*						1000				

Project Location: 60520893.3.2

Project Number: FANG

## Log of Boring 145-MW01

### Sheet 1 of 4

**AECOM** 

Date(s) Jun 13, 2018	Logged By Chad Neptune	Checked By
Drilling Method HSA - 6, Diameter	Drill Bit Size/Type <b>6in</b>	Total Depth of Borehole 135 feet bgs
Drill Rig Type Track Rig	Drilling Contractor Cascade - Norm Hunger	Approximate Surface Elevation 318 AMSL
Groundwater Level and Date Measured 125' bgs 6/13/18	Sampling Method(s) SPT	Hammer Data
Borehole Backfill	Location Building 145 FANG - Fresno, CA	

Depth (feet)	Graphic Log	Material Type	MATERIAL DESCRIPTION	Well Log	REMARKS AND OTHER TESTS	Sample Type	Recovery %	PID Reading, ppm	Time	
-		SM	Silty Sand (SM), loose, 7.5YR 5/4 brown, dry, 80% fine to medium sub-angular sand, 20% no plasticity fines, homogenous. Sample is of disturbed material from previous air knife pre-clearance boring.				-			
-		SM	Silty Sand (SM), medium dense, 7.5YR 5/4 brown, dry to  moist, 80% fine to medium sub-angular sand, 20% no plasticity fines, homogenous, rapid dilatency.				18/18_ - - -	0.0	0645	
-		SC	Clayey Sand (SC), medium dense, 7.5YR 4/4 brown,  moist, 80% fine sand, 20% no to low plasticity fines, homogenous, slow dilatency.				18/18_	0.0	0700	
15 —		SP-SM	Poorly Graded Sand with Silt (SP-SM), loose, 7.5YR 6/8  reddish yellow, moist, 90% fine to medium sub angular sand, 10% no plasticity fines, homogenous, rapid dilatency.				18/18_ - -	0.0	0710	
ANG PFC.bg4[FANG PFC.tpl		SP	Poorly Graded Sand (SP), loose, 7.5YR 4/4 brown to 7.5YR 5/6 strong brown, moist, 95% fine to coarse sub-angular sand, 5% no plasticity fines, gradually coarseness with depth, some weak cementation, rapid dilatency.				 18/18 - - -	0.0	0715	
:\Users\chad_neptune\Desktop\FA\ 02 1 1 1		SP-SM	Poorly Graded Sand with Silt (SP-SM), medium dense, 7.5YR 5/3 brown to 7.5YR 7/6 reddish yellow bottom of sample, moist, 90% fine to medium angular to sub-angular sand, 10% no to low plasticity fines, rapid dilatency.				 18/18_ - - -	0.2	0730	

Project Location: 60520893.3.2

Project Number: FANG

## Log of Boring 145-MW01

### Sheet 2 of 4

**AECOM** 

	Graphic Log	Material Type	MATERIAL DESCRIPTION	Well Log	REMARKS AND OTHER TESTS	Sample Type	Recovery %	PID Reading, ppm	Time
- - -		SP-SM	↓ As above except, 7.5YR 7/6 reddish yellow with mottling     − of 7.5YR 6/3 light brown, some weak cementation, rapid     − dilatency.     −				18/18_ - -	0.0	0735
- - -		CL	Lean Clay with Sand (CL), medium stiff, 7.5YR 6/3 light  brown, moist, 80% low to medium plasticity fines, 20%  fine sand, no dilatency, stratified with interbedded layers  of material 30ft, medium dry strength.				 18/18_ - -	0.0	0750
0 —		CL	As above				18/18 - - - -	0.0	
5 <del>-</del> - -		SM	Silty Sand (SM), medium dense, 7.5YR 6/4 light brown, moist, 60% fine sand, 40% no to low plasticity fines, slow dilatency, homogenous, some weak cementation.				10/18_ - -	0.0	0845
- - -		ML	Sandy Silt (ML), stiff, 7.5YR 4/6 strong brown, moist, 60%  low plasticity fines, 40% fine sand, homogenous.				 18/18_ _ _ _	0.1	0855
- -		SM SP-SM	Silty Sand (SM), medium dense, 7.5YR 5/2 brown, moist, 60% fine sand, 40% no plasticity fines, rapid dilatency, homogenous.  Poorly Graded Sand with Silt (SP-SM), loose, 7.5YR 4/1 dark gray, moist, 90% fine sand, 10% no plasticity fines, rapid dilatency, homogenous, micaceous.				18/18_ - - -	0.0	0900
		SP-SM	As Above.				10/18_ - -	0.0	0915

Project Location: 60520893.3.2

Project Number: FANG

Log of Boring 145-MW01

### Sheet 3 of 4

**AECOM** 

g Depth (feet)	Graphic Log	Material Type	MATERIAL DESCRIPTION	Well Log	REMARKS AND OTHER TESTS	Sample Type	Recovery %	PID Reading, ppm	Time
-		SP-SM	Poorly Graded Sand with Silt (SP-SM), loose, 7.5YR 5/6 strong brown, moist, 90% fine to medium sub-angular sand, 10% no plasticity fines, rapid dilatency, homogenous, micaceous.	-			12/18_	0.0	0920
70 -		SP	▼Poorly Graded Sand (SP), medium dense, 7.5YR 6/8 reddish yellow, moist, 95% fine to medium sub-angular sand predominately medium, 5% no plasticity fines, rapid dilatency, homogenous.	- - - -			 12/18_ - - -	0.0	0930
75		SP	As Above.				 18/18_ - - -	0.0	1020
80 —		SP	As above except, loose, 7.5YR 8/1 white	- - - -			 18/18_ - - -	0.0	1030
85		SP	As Above.	- - - -			18/18_ - -	0.0	1045
90		SP	As Above	1 - - -			18/18_ - - -	0.0	1055
95 -		ML	Silt with Sand (ML), medium stiff, 7.5YR 6/1 gray, moist, 85% no to low plasticity fines, 15% fine sand, low dry strength, rapid to slow dilatency, homogenous,				- - - -		

Project Location: 60520893.3.2

Project Number: FANG

## Log of Boring 145-MW01

### Sheet 4 of 4

**AECOM** 

` -	Graphic Log	Material Type	MATERIAL DESCRIPTION	Well Log	REMARKS AND OTHE TESTS	א Sample Type	Recovery %	PID Reading, ppm	Time
, - - -		SP-SM	Poorly Graded Sand with Silt (SP-SM), dense, 7.5YR 6/2 pinkish gray, 90% fine to medium sand predominately fine, 10% no plasticity fines, micaceous, rapid dilatency, homogenous,	- - -			18/18_ - -	0.0	1100
<del>-</del> -		SP	▼Poorly Graded Sand (SP), medium dense, 7.5YR 5/3  brown, moist, 95% fine to medium angular sand, 5% no plasticity fines, micaceous, homogenous.	- - - -			18/18_ - -	0.0	1210
<del>-</del>		SP	As Above, except some weak cementation	- - - -			18/18_ - -	0.0	1225
;		SP	As above except, fine to coarse sand	- - - -			 18/18_ - -	0.0	1230
		SM	Silty Sand (SM), medium dense, 7.5YR 5/4 brown, moist to wet, 80% fine to medium sub-angular sand, 20% no to low plasticity fines, homogenous, weak cementation.	- - -			 18/18_ - -	0.0	1240
- - -		SM	As Above.	- - - -	—		 18/18 - -	0.0	1255
-		SM	As Above.	_			6/18 _ -	0.0	1330
- -		SM	- As Above  Bottom of Boring @ 135" bgs	]			_		

Project Location: 60520893.3.2

Project Number: FANG

### Key to Log of Boring

### Sheet 1 of 1

### AECOM

1360 E Spruce Ave, Suite 101 Fresno, CA 93720 (559) 448-8222

Depth (feet)	Graphic Log	Material Type	MATERIAL DESCRIPTION	Well Log	REMARKS AND OTHER TESTS	e T	Recovery %	PID Reading, ppm	Time	
	2	3	4	5	[6]	7	8	9	10	

#### **COLUMN DESCRIPTIONS**

- Depth (feet): Depth in feet below the ground surface.
- 2 Graphic Log: Graphic depiction of the subsurface material encountered.
- Material Type: Type of material encountered.
- 4 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive
- 5 Well Log: Graphical representation of well installed upon completion of drilling and sampling.
- 6 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.
- Sample Type: Type of soil sample collected at the depth interval
- Recovery %: Length of sample interval recovered in sampler.
- PID Reading, ppm: The reading from a photo-ionization detector, in parts per million.
- 10 Time: Time sample was collected.

#### FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity

COMP: Compaction test

CONS: One-dimensional consolidation test

LL: Liquid Limit, percent

PI: Plasticity Index, percent

SA: Sieve analysis (percent passing No. 200 Sieve)

UC: Unconfined compressive strength test, Qu, in ksf WA: Wash sieve (percent passing No. 200 Sieve)

#### **MATERIAL GRAPHIC SYMBOLS**

Lean CLAY, CLAY w/SAND, SANDY CLAY (CL)

SILT, SILT w/SAND, SANDY SILT (ML)



Clayey SAND (SC)

Silty SAND (SM)

Poorly graded SAND (SP)

Poorly graded SAND with Silt (SP-SM)

### **TYPICAL SAMPLER GRAPHIC SYMBOLS**



Auger sampler

3-inch-OD California w/

**Bulk Sample** 



CME Sampler

2.5-inch-OD Modified

California w/ brass liners



Pitcher Sample

2-inch-OD unlined split

spoon (SPT)

Shelby Tube (Thin-walled, fixed head)

### OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)

Water level (after waiting)

Minor change in material properties within a stratum

Inferred/gradational contact between strata

—? – Queried contact between strata

#### **GENERAL NOTES**

brass rings

- 1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- 2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Project l	Name: Fresno ANGB - PFAS SI	Site: Fresno ANGB								Hole ID: 104. 5801					
Project	Number: 60520893.3.2	Northing:	Northing:							Total Depth (feet); 5					
Drilling	Contractor: Cascade Drilling	Easting:				27 17				Date /	Time Started: 5-16-18				
Driller:	Cesar Inzunza, Cody Hamer	Elevation	(feet M	ISL):	G	roun	d:			Date /	Time Finished: 5-16-18				
Drilling	Equipment: Hand Auger	▼ Water	Depth l	Durin	g Drill	ing (	feet 1	bgs):		Date /	Time Completed:				
Drilling	Method: Hand auger	Logged B	y: Dar	iiel Co	опеіа	7.7.1		340000		Checked By:					
Borehol	le Diameter (inches): 4	Weather/Co	mments	n.							<del></del>				
		1	Lo	g		S	am	ples		Ħ					
Depth (feet)	USCS Description		Graphic	USCS or Rock Type	Attempted Recovered	Mcthod	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)				
Depth (feet)	Silty Sand; stiff, d Jellowet brown (WYR (U,15,85,0) medium plasticity, total block		SM	5/5	11/1	\ \ -	0.0	v		FR-104-5801-1					
5	The 5' bys	7,		1000000				0.0			FR-104-5801-5				
10-															
15-								5 N							
	*					# A			1991						

roject Name: Fresno	ANGB - PFAS SI	Site: Fres	no AN	GB						Hole	D: 104-5802
roject Number: 6052	0893.3.2	Northing:								Total I	Depth (feet): 5
Orilling Contractor: Ca	scade Drilling	Easting:								Date /	Time Started: 5.17.18
oriller: Cesar Inzunza,	Cody Hamer	Elevation (	feet M	SL):	G	round	d:			Date /	Time Finished: 5-17-18
rilling Equipment: H	and Auger	▼ Water I	Depth I	During	g Drilli	ing (f	ect b	gs):		Date /	Time Completed:
orilling Method: Hand	ouger	Logged By	r: Dan	iel Co	пеіа					Check	ed By:
orchole Diameter (incl	nes): 4	Weather/Co	mments	:							***
		,	Lo	g		S	amp	oles	į.	Ę	
Silty Son	USCS Description		Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
Silty Son to moist	d; very stiff, yellowsh boo			5^	5/5	HA		٥٠٥			FR-104-580Z-1
lov plas	ticity, blocky k s	<b>7</b> 1			2			6.0			FR-104-5802-5
				1							1

### Soil Boring Log

Sheet 1 of 2

Project Nam	e: Fresno ANGB - PFAS SI	Site: Fres	no AN	IGB						Hole	ED: 100-5801
Project Nun	aber: 60520893.3.2	Northing:									Depth (feet): 5
Drilling Con	stractor: Cascade Drilling	Easting:								Date /	Time Started: 5.17.18
Driller: Cesa	ar Inzunza, Cody Hamer	Elevation (	feet M	SL):	G	roun	d:			Date /	Time Finished: 5.17.18
Drilling Equ	ipment: Hand Auger	▼ Water D	epth !	Durin	g Drill	ing (	feet l	ogs):		Date /	Time Completed:
Drilling Met	hod: Hand auger	Logged By	: Dar	niel Co	orreia					Check	ced By:
Borchole Dia	ameter (inches): 4	Weather/Cor	nments								
Depth (feet)	USCS Description		Graphic	USCS or Rock Type	Attempted Recovered		Run Number	PID/FID (ppm)	Timc	Well Diagram	Remarks (list sample numbers here)
1 - 511 2 - 10, 1 - 10,	ty soul, very str sst, yellowish brown 15,85,0) medium sourced, no odor 005' bys	ff, (107/203/8) plostic,		5M	546	AH		0.0			FR-100-5801-5

Projec	t Name: Fresno ANGB - PFAS SI	Site: Fresi	10 AN	IGB						Hole	ID: 100-MWO]
Projec	et Number: 60520893.3.2	Northing:								Total I	Depth (feet): 135
Drillin	ng Contractor: Cascade Drilling	Easting:								Date / T	Time Started: 5/22/18
Driller	, Norman Hunger, Cesar Inzunza, Cody Hamer	Elevation (	feet M	ISL):	G	iround	d:			Date / T	Time Finished: 5/23/18
Drillin	ng Equipment: LAR CME 75	▼ Water D	epth :	During	g Drill	ing (f	eet b	gs):		Date / 1	Time Completed: 5/23/18
Drillin	ng Method: Hollow-Stem Auger	Logged By	: Da	niel Co	огтеја			-		Checke	ed By:
Borch	ole Diameter (inches): 8	Weather/Cor	nments	s:							4 1 4 1 7 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			Lo	)g		S	amp	oles		E	
Depth (feet)	USCS Description		Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
5-11					0	AX	2			Company of the contract of the	Arr knife to 10' bys
Depth (foct)	Poorly Graded sond; stiff, dry, dark yellow brown(10 yr 3/4) (0,5, law phasticity, no order			SP	1.5	SS	3	3		The state of the s	

#### Soil Boring Log (Continued)

Sheet 2 of 6

Proje	ct Name: Fresno ANGB - PFAS SI	Site	: Fr	esno A	NGE	3			Hole l	D:
		L	og			Sam	ples		ш	
Depth (feet)	USCS Description	Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
25	poorly Graded sond ys: It Stiff, dry, dark grayish brown(10 to 4/2), (0, 10, 90,0) low-med. plasticity, ro odd		sp.	1.5	SS	5			(1111111)	
1.1.1.1.			Sp- SM	/1.5	5.5	Ь			1111111	
30-	Sand, poorly graded, stiff, drik yellarish bran (10 Yegs 3/4), (0,5,95,0) moist		SP	1.3	25	7			1111111	
35-	Pourly Graded Soul of Silt, stiff, day, dark branchors \$/3), (0,10,90,0), no old	_	Sp.	17	55	8			1111111	
40-			58- SA	1.5	S	9		k	777777	
45	51/4-50nd;		5/							Form OABLANKLO

### Soil Boring Log (Continued)

Sheet 3 of 6

roject Na	ame: Fresno ANGB - PFAS SI	Site:	Fr	esno A	NGB				Hole	ID:
		Lo	g		5	am	ples		am.	
(Loct)	USCS Description	Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Тіте	Well Diagram	Remarks (list sample numbers here)
50-	rilty Sord; stiff-very stiff, ry to moist, yellowish renal le YR 5/6), 10, 15,85,0), redown plasticity, no		SM	1.5	55	(0				
			SM	1.5	55	11				
5—			5m	1.5	\$5	12				
0-	creasing % of times		51	1.3	\$5	13				
- (10	corry graded sond w/5iH, norst, dark yellowish-bour oyr 4/6), (0,10,90,0), low astraity, no other		SP-	1 /	53	۱4			min min	

#### Soil Boring Log (Continued)

Sheet 4 of 6

et Name: Fresno ANGB - PFAS SI	Site	Fn	esno A	NGE	3			Hole	ID:
0.00	Lo	og		S	Sam	ples		аш	
USCS Description	Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagr	Remarks (list sample numbers here)
Poorly Graded sand U/ 5.74		54- 5M	1.5	55	Is			110000	
				\$5	16	,		1111111	
decreasing % fines								21111	
		58- 5M	1.5	55	17			11111	
increasing times		50- 5M	1.3	55	18			11111	
5:1ty Sord; stiff, mist, yellowish brown (1042 5/4), med. plasticity, to odor	-	- 5^		SS	11			111111111111	
	DSCS Description  Poorly Graded Sand V/ 5.14  decreasing % fines increasing fines	Decreasing % fines  increasing fines	USCS Description  Log  John Sold Sold Sold Wasth  Sp.  Sm.  Jecreasing % fines  Sp.  Sm.  Accreasing fines  Sp.  Sm.	USCS Description  Log  July  John John John John John John John John	Log paper poorly broaded sand of sith Sp. 1.5 55  Mecreasing forms  Sp. 1.5 55  Metreasing forms  Sp. 1.5 55	USCS Description  Log Sam  Joseph Chapping  Poorly broked Sand U/Sit St. St. St. St. St. St. St. St. St. St	Log Samples  USCS Description  Log Samples  USCS Description  USCS Description  Output  Output  SA (1.8 SS) IS  Accreasing fores  SA (1.8 SS) IS  Accreasing fores	Log Samples  USCS Description  Log Samples  Order S	Log Samples  USCS Description  Log Samples  Uscs Manual Samples  Uscs Description  Poorly Graphy Samples  Samples  Uscs Description  Samples  Uscs Description  Samples  Uscs Description  Samples  Samples  Uscs Description  Samples  Sampl

### Soil Boring Log (Continued)

Sheet 5 of 6

Proje	ct Name: Fresno ANGB - PFAS SI	Site	: Fr	esno A	NGE	3			Hole I	D:
		L	og		5	Sam	ples		E E	
Depth (feet)	USCS Description	Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Тітс	Well Diagram	Remarks (list sample numbers here)
	Silty soul		5,4	15	SS	20			11111	
-	increase in moisture			4					11111	*,
100-			5M	1.5	\$5	24			KANE ALIA	
-	Acressing moisture, decreasing frees Poorly Graded Sord U/Sill,	. ~			14					
1 1 1 1	poorly Graded Sond U/Sill, moist, dark yellowsh brown (10 YR 3/6), 10, 10,90,0) med. plasticity		Sp.	1.5	53	2-2			111111111111111111111111111111111111111	
110-	Sord; poorly graded, stiff-med, stiffness, f.m		Sp	1.5	SS	23			WID 25 43 43 4	
115	sand grams, yellowsh born (10 YIR 5/4), most -vet, no odar vet		<.		ė					7
			54	1.5	55	24				

#### Soil Boring Log (Continued)

Sheet 6 of 6

Projec	t Name: Fresno ANGB - PFAS SI	Site	Fn	esno A	NGB	es.			Hole	ID:
		Le	og		S	am	ples		am	
(feet)	USCS Description	Graphic	USCS or Rock Type	Attempted	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
	Sord, wet		SP	1,5	Ss	ΣS				
125	Sond, vet		SP	1.5	\$5	24				
130-	Sord, increasing thes		SP	1.5	55	17				
135	TO @ 135' by				22					

Proje	ect Name: Fresno ANGB - PFAS SI	Site: Fres	no AN	GB						Hole	ID: 157- 5801		
Proj	ect Number: 60520893.3.2	Northing:								Total 1	Depth (feet): 5		
Drill	ing Contractor: Cascade Drilling	Easting:								Date /	Time Started: 5.18.18		
Drill	er: Cesar Inzunza, Cody Hamer	Elevation (	feet M	SL):	G	iroun	d:			Date /	Time Finished: 5.10.18		
Drill	ing Equipment: Hand Auger	▼ Water D	Depth l	Durin	g Drill	ing (	feet b	gs):		Date /	Time Completed;		
Drill	ing Method: Hand auger	Logged By	; Dan	iiel Co	orreia					Check	ced By:		
Bore	hole Diameter (inches): 4	Weather/Cor	runents	1									
Depth (feet)	USCS Description		Graphic	USCS or Rock Type	Attempted Recovered		Run Number	oles (mdd)	Timc	Well Diagram	Remarks (list sample numbers here)		
(jagj)  Original copies of logs were stolen from field vehicle, these are built from memory.	Poorly graded Sond - very still, any, a yellowsh-brown (10 kg (0,5,950), no plastic missive, no other TO @ 5' bgs	stiff when you			5/5						FR-157-5801-5		

### Soil Boring Log

Sheet 1 of 2

Project Name: Fresno ANGB - PFAS SI	Site: Fres	ino AN	IGB						Hole	ID: 157-5802
Project Number: 60520893.3.2	Northing:		1000						JUNE 20015	Depth (feet): 5
Drilling Contractor: Cascade Drilling	Easting:		3.0						Date /	Time Started: 5. 18.19
Driller. Cesar Inzunza, Cody Hamer	Elevation (	feet M	SL):	G	iroun	d:		•••	Date / ?	Time Finished: 5 . 18-19
Drilling Equipment: Hand Auger	▼ Water I	Depth I	Durin	g Drill	ing (	feet b	ogs):		Date /	Time Completed:
Drilling Method: Hand auger	Logged By	y: Dan	uel Co	теіа					Check	ed By:
Borehole Diameter (inches): 4	Weather/Co	mments	:						Lac .	V
		Lo	g		S	amp	oles		Ħ	
턴() USCS Description	on	Graphic	USCS or Rock Type	Attempted Recovered	Mcthod	Run Number	PID/FID (ppm)	Тітс	Well Diagram	Remarks (list sample numbers here)
poorly Granded  very still, dry, d  brown (10 YR 476),  re-low plasticity	Sord; ork yellow 10 595.01		5 P	5/5	HΛ					FR-157-5802-1
Poorly Graded  very still, dry, d  brown (10 YR 476),  No - low plasticity odor  TO @ 5' bys	1,00									FR-197-5802-5
10-				Alberta Co.						
15-							,			
se are huilt from memory		:								

	ject Name: Fresno ANGB - PFAS SI	Site: Fres	no AN	ſĠВ	-				-	Hole	ID: 157-5803	
Pro	ject Number: 60520893.3.2	Northing:									Depth (feet): 5	
Dri	lling Contractor: Cascade Drilling	Easting:								Date /	Time Started: 5.19.10	
Dri	ller: Cesar Inzunza, Cody Hamer	Elevation (	feet M	SL):	C	iroun	d:			1	Time Finished: 5-18-18	
Dri	lling Equipment: Hand Auger	▼ Water [	Depth l	Durin	g Drill	ing (	feet l	ogs):		Date /	Time Completed:	
Dri	lling Method: Hand auger	Logged By	: Dar	iel Co	orreia					Check	red By:	
Bor	ehole Diameter (inches): 4	Weather/Cor	mments	E				- A				
		1	Lo	g		S	amj	oles	700	E		
Depth (foot)	USCS Description		Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)	
Original co	Pourly Graded sond Stiff, dry to moist, do	ulsiti; vk		<b>50</b>	SI						FR-157-5803-1	
the discussion of the discussi	Pourly Graded Soul  Stiff, dry to moist, de  grayish brown (10 yr 4  10,10, 90,0), low plushi  fiss wed, no odor, root  TO @ 5'bgs	(2), alty,		5^	5/5	Н					FR-152-5803-5	

Project N	Name: Fresno ANGB - PFAS SI	Site: Fres	no AN	IGB						Hole	10: APR- 5801
Project N	Number: 60520893.3.2	Northing:									Depth (feet): 5
Drilling (	Contractor: Cascade Drilling	Easting:								Date /	Time Started: 5-18-10
Driller: (	Cesar Inzunza, Cody Hamer	Elevation (	feet M	ISL):	(	iroun	d:				Time Finished: 5.16.19
Drilling F	Equipment: Hand Auger	▼ Water I	Depth 1	Durin	g Drill	ling (	feet l	bgs):	-	Date /	Time Completed:
Drilling M	Method: Hand auger	Logged By	: Dar	niel Co	orreia					Check	ed By:
Borehole	Diameter (inches): 4	Weather/Cor	mments	s:							
			Lo	g		S	amj	ples		Ħ	
(foci)	USCS Description		Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
2 - 6	coorly broaded sond staff, dry, dark yello rown (10 YR 3/6), 10, ou plasticity, blocky oder	2,95,0)		SP	5/5	НА	,	0.0			FR-APR-5801-1
5	ov plasticity, blocky, oder TD @ 5' bys	,re						0,0			FR- APR-580)-5
10—										T	
15-											
								4.			

### Soil Boring Log

Sheet 1 of 2

Project Name: Fresno ANGB - PFAS SI	Site: Fres	sno AN	IGB						Hole	ID: APR-SBOZ
Project Number: 60520893.3.2	Northing:								1	Depth (feet): 5
Drilling Contractor: Cascade Drilling	Easting:								Date /	Time Started: 5 · 17.19
Driller: Cesar Inzunza, Cody Hamer	Elevation (	(feet M	SL):	G	roun	d:			Date /	Time Finished: 5.17.18
Orilling Equipment: Hand Auger	▼ Water l	Depth 1	During	g Drill	ing (f	ect b	gs):		Date /	Time Completed:
Orilling Method: Hand auger	Logged By	y; Dar	niel Co	rreia					Check	cd By:
Borehole Diameter (inches): 4	Weather/Co	numents	:				•			
		Lo	g		S	amp	les		6	
USCS Description		Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
Poorly broked sould swiff, moist, derk girls brown (10 YR 4/2), 10, 10 yr medium plostices from the S' bys	1/5:14; reg ish .0,90,0)	58-	54- 5^	4/5	НА					FR- APR-5802-5

Project Name: Fresno ANGB - PFAS S	I Site: Fre	sno AN	IGB						Hole	ID: APR-5803
Project Number: 60520893.3.2	Northing:	2							Total l	Depth (feet): 5
Drilling Contractor: Cascade Drilling	Easting:								Date /	Time Started: 5.17.18
Driller: Cesar Inzunza, Cody Hamer	Elevation	(feet M	ISL):	C	iroun	d:			Date /	Time Finished: 5.17.18
Drilling Equipment: Hand Auger	▼ Water	Depth :	Durin	g Drill	ing (	feet b	ogs):		Date /	Time Completed:
Drilling Method: Hand auger	Logged B	y: Dai	uel Co	orreia					Check	ed By:
Borehole Diameter (inches): 4	Weather/Co	mment	S:							
		Lo	g		S	amp	oles		E	
턴() USCS Descript	ion	Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
Poorly broked so stiff, dry, dork of brown (10 Yr 4/2)  Low medium planting from the first week, no order  The 5' base	iond w/sitt; rowish (0,10,90,0) strity,		SP-SA	5/5	NA.					FR-APR-5803-5
							9			x

Project Name: Fresno ANGB - PFAS SI	Site: Fres	no AN	GB						Hole	ID: APR-58 04
Project Number: 60520893.3.2	Northing:			100					Total	Depth (feet): 5
Drilling Contractor: Cascade Drilling	Easting;								Date /	Time Started: 5.18.18
Driller: Cesar Inzunza, Cody Hamer	Elevation (	feet M	SL):	G	iroun	d:	228		Date /	Time Finished: S.18.18
Drilling Equipment: Hand Auger	▼ Water I	Depth I	Durin	g Drill	ing (I	feet b	ogs):		Date /	Time Completed:
Drilling Method: Hand auger	Logged By	. Dan	iel Co	этеіа					Check	ted By:
Borchole Diameter (inches): 4	Weather/Cor	mments	Sv	ņ	10	V	m			
		Lo				amp		r	ш	
USCS Description		l	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
Digital Discription  Digital Pourly broked South  to very 5HFF, dry,  Look yellowish brown  (10 YR 3/6) (0, 5, 95, 0)  plasticity - rock pour  to @ 5' bys	i, shift in		54	5/5	hA	•				FR-APR-SBOW-1
position for the position field webicle 10-	ker "								red and	FR-APR-5804-5
bese are built from memory						11 N				Form: 00-8LANK LOG

Project Na	ame: Fresno ANGB - PFAS SI	Site: Fres	no AN	IGB						Hole	ID: APR-SBUS
Project N	umber: 60520893.3.2	Northing:									Depth (feet): 5
Drilling C	Contractor: Cascade Drilling	Easting:								Date /	Time Started: 5.18.18
Driller: C	Cesar Inzunza, Cody Hamer	Elevation (	feet M	ISL):	G	round	d:			Date /	Time Finished: 5.18.18
Drilling E	Quipment: Hand Auger	▼ Water I	Depth l	During	g Drill	ing (f	feet b	gs):		Date /	Time Completed:
Drilling N	Method: Hand auger	Logged By	/: Dar	niel Co	rreia					Check	ed By:
Borcholc	Diameter (inches): 4	Weather/Co	niments	: Sv	m	١, ١	M				- Col
Depth (feet)	USCS Description		Graphic	USCS or Rock Type	Attempted		Run Number	PID/FID selection (bbm)	Time	Well Diagram	Remarks (list sample numbers here)
	Poorly Groded Sond; dry to most, dark yellowsh brown (1042 0,3,95,0), low plas racssive, to odor TO @ 5' bys	shif 3/4) tary,		\$4	5/5	HA					FR-APR-5805-5
					·						

Projec	Name: Fresno ANGB - PFAS SI	Site: Fre	no Al	NGB						Hole	ID: APR-MWOI
Projec	t Number: 60520893,3,2	Northing:							5,5,5		Depth (fect): 135
Drillin	g Contractor: Cascade Drilling	Easting:						-511		Date /	Time Started: 5/22/18
Driller	Norman Hunger, Cesar Inzunza, Cody Hamer	Elevation	(feet M	ISL):	C	iroun	d:			Date / 1	Firme Finished: 5/23/18
Drillin	g Equipment: LAR CME 75	▼ Water	Depth	Durin	g Drill	ing (f	feet b	gs):		Date /	Time Completed: 5/23/18
Drillin	g Method: Hollow-Stem Auger	Logged B	y: Da	niel C	orreia					Check	ed By:
Borcho	ole Diameter (inches): 8	Weather/Co	mment	s:							
			L	og		S	amp	oles		E	8
Depth (feet)	USCS Description		Graphic	USCS or Rock Type	Attempted Recovered	Mcthod	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
					d	AK	1				
(logi)					٥	AK	2				Air krife to 10' bgs on 5-16-18
	Poorly Graded Sond; dry, dark yellowsh - 1 (10 YR \$3/4), (0,5,95,0 (or polasticity	bon		SP	1.5	55	3				
from momory				S	1.5	55	4				
-	\$ foothy Crowled Sand of	 15iH	_	SP.							

### Soil Boring Log (Continued)

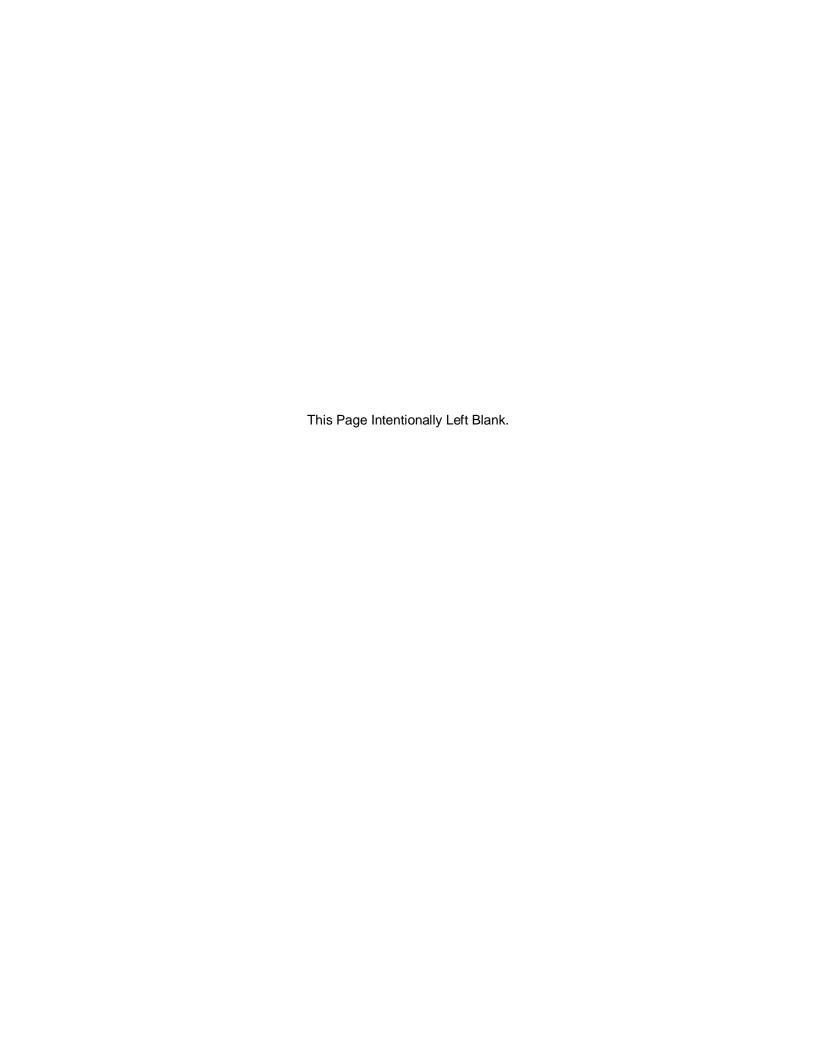
Sheet 2 of 3

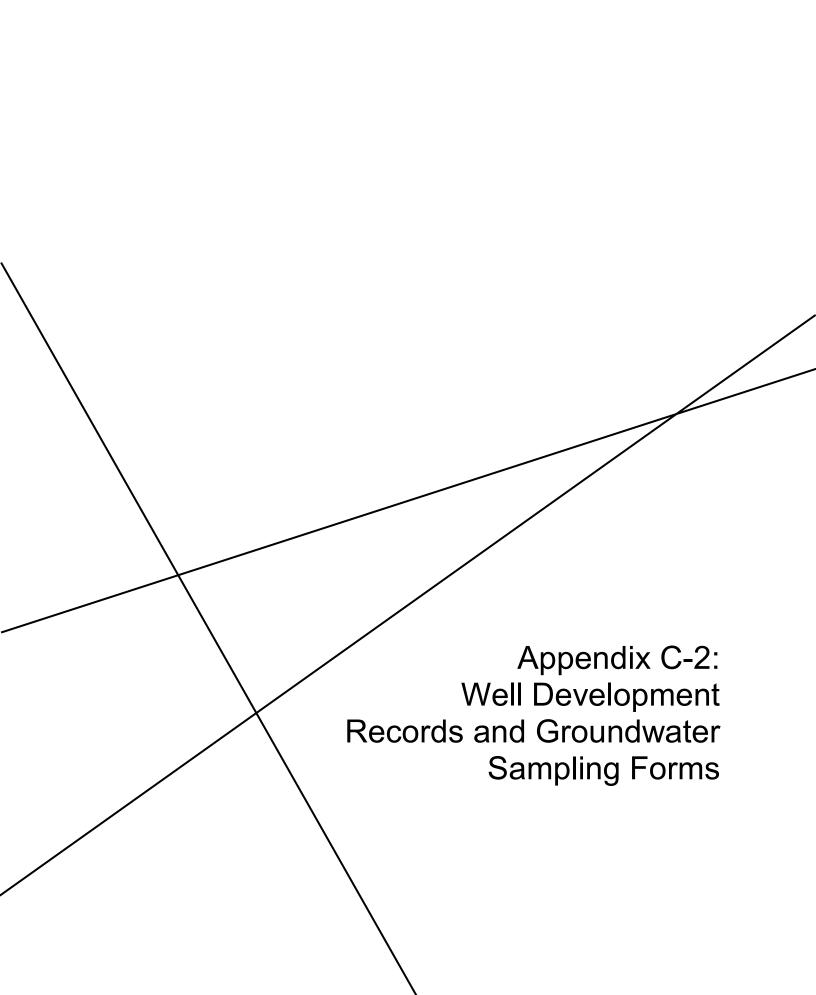
	le ID:	Hole				1	NGB	ѕпо А	Fre	Site:		t Name: Fresno ANGB - PFAS SI	Projec
		E			ple	Sam	5		g	Lo			
Remarks ample numbers here)	(list san	Well Diagram	Time	(mdd)	CI3/CI4	Run Number	Method	Attempted Recovered	USCS or Rock Type	Graphic		USCS Description	Depth (feet)
						s	SS	1.5	51- 5M		۲,	Pourly Graded sond u/2:17; moist-vet, dark brown (10 Yk 4/3), (0,10,90,0) low-med. plastic	
						6	Ss	1.5				vet, no recovery	25
						7	55	0/				wet, no recovery	30-
						8	55	% 1.8				uct, no recovery	35-
						9	55	%s				vet, ro meovery	40
												vet, no neavery	40

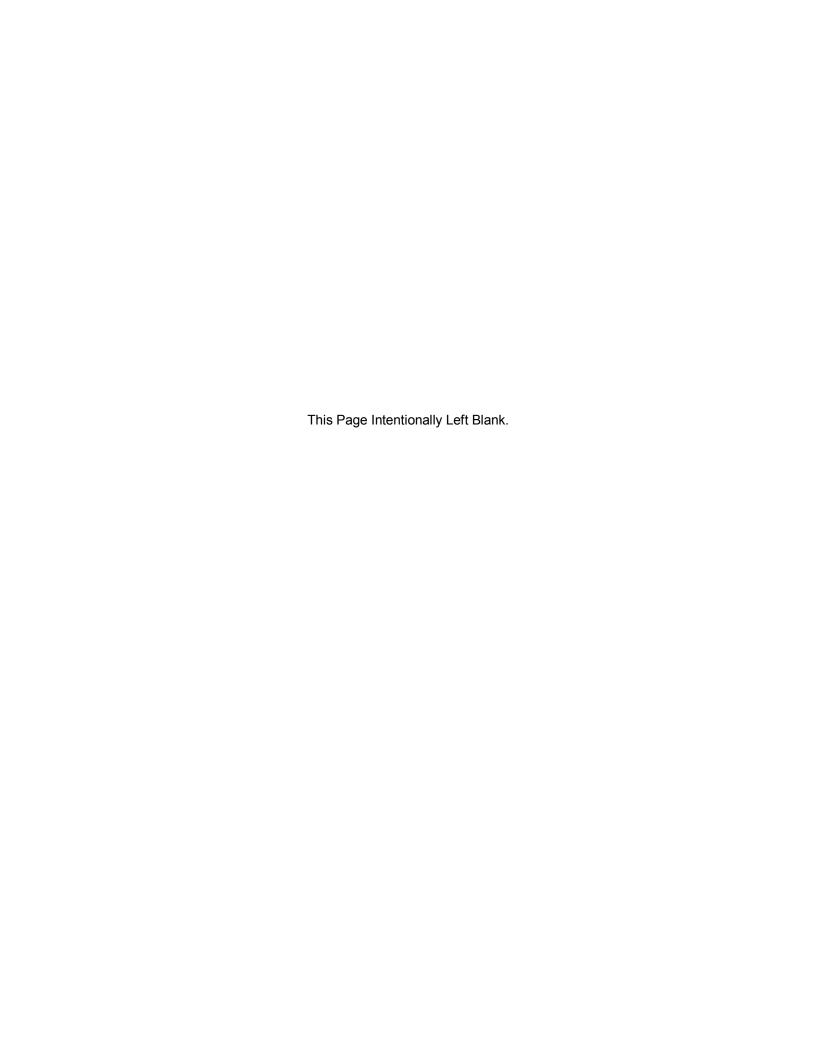
#### Soil Boring Log (Continued)

Sheet 3 of 3

Projec	ct Name: Fresno ANGB - PFAS SI	Site:	Fr	esno A	NGE	3			Hole	ID:
		Lo	g		5	Sam	ples	***	am	
(feet)	USCS Description	Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time	Well Diagram	Remarks (list sample numbers here)
-	Vet, no recovery			1.5	ક્ક	v				
50-	let, ro recovery			%,5	55	11				
55-	vet, ra recovery			%,5	55	12				
60-	vet, or recovery, stop			%.5	55	13				
65										







#### **Monitoring Well Development Form**

Page 1 of 4

LOCATION	Site: F7	resur 1	an G		THU	Loci	D: <b>F</b>	TA-	n	wo	1333			Date:		119/18
LOCATION	Project Na	me: PFC	-SI		***************************************	Proje	ect Num	nber: 60	5	1000	,312			Reco	rded By	:C. NephuChecked By:
	Developm	ent Equipment: el Indicator Typ	Water	m.	55 B	ail.	v,	55	50	rye	Blo	ck.				
EQUIPMENT	Water Lev	el Indicator Typ	e/ID#: 56	ast)			Wa	ater Qualit	у Ме	ter Type:	PSI	<sup>®</sup> no				
	PID Type/	ID#: -	vanaansa saasa	No un anno anno anno	oronovana sistem		Eq	uipment D	econ	Liqu	inox	*	**********	(nenenek	*******	
	Casing ID	(inches) [a]: 2	- Par	<u>Vanianannan</u>	Ur	it Casing	Volum	ne (gallon/l	linear	foot) [b]:	2.16	Init	ial Dep	pth to	Water (	FT BTOC) [c]: 110, 73
WELL	Total Well	Depth (FT BTC	C) [d]: 126		Wa	ater Colu	mn Thi	ckness (F	T) [d-	c]: 15.2	2	We	ell Volu	ıme (g	allon) {[	[d-c] x b}: 2. 4352
	Ground Co	ondition of Well:	Popha	(+ pare	ment											
CASING	Casing ID	(inches) [a]:				1.5	2.0	2.2	3.0	4.0	4.3	5.0 6.0	7	7.0	8.0	Ambient PID (ppm):
INFO	Unit Casir	g Volume (gal/l	inear foot) [b]:	VIII.VIII.		0.09	0.16	0.20	0.37	0.65	0.75	1.0 1.5	2	2.0	2.6	Well Head PID (ppm):
Date (MM/DD/YY)	Time (24 hr)	Method (pump, surge, bail)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (Lpm)	Te (°	mp C)	Specifi Conducti (mS/cn	ivity	рН	DO (mg/L)	Turbic (NTL		Sedi (m	ment L/L)	Comment
0/19/18	1355	Bail	110,78	2	-	-		-			-	_		-		Begin bailing
	1410	Surne	-	-	-					-	_	Time.	-		_	Bottom of 6092
	1435	Brit		9	_		_	-		-	_		_	_		Bottom of 60592
	1455		111.05		-	_	-				_	-				
	1505	Ball		18	-	_					-	7.53		_	_	
	1542	Sunge	111.09	-	-	_		-		_	-	-		*	_	
1	1562	Ban	T		-	-	-	-			- 67	_ =		_	_	
la - li or	1615	Stops	ordery			-		O M								to-110 241
120/18	0828	puntp	110,87	18	-	21	7	100	_	201	1112			700		TD=130,74!
	0831	pump		19	.57gp .57gp	01	7	690		7.87			-	a==	-	
	0841			35	1.2 + 9/	21	7	595	-	7.43	4.18	> 7100	- PARTY			
	0855	Stopton	sef t	raffic	1379	1001.	4	שריב	-	7135	1,10	- "	000	-		
	0945	0107100	110.82	45	,53gg	. 72	u	546		7,71	3.55	>10	20		_	
	6950	2	- IDEV 6	47	.53901	21.		514,6			3.92	_		_		
	1000	P		53	5360	121		542		7.36	3.80			_		Stop butet praffic
	1022	P	-	53	.5660	w24.	0	539			3.21	7 100	00			
	1030	P	-	55	, 56 g pm	21.	6	524.		7.43	3,99	Sta	00	-		
	1035	9		57	, 56 gpn	121.		519.9		7.34	4.04	5'10	00	-		
	1040	P	_	6D	15690h	121.	7	509.0		7.31	4,10	>100	0			
4	1045	P	•	62	,569pn	121.	5	501,9		7.36	420	7.160	90	-		



#### **Monitoring Well Development Form**

Page Lof 4

LOCATION	Site:Fresn	o Air National	Guard	50		LocID:	PTA-W	wo	1		Date: 6//	19/18
LOCATION	Project Na	me: FANG - P	FC SI				mber:60520893				Recorded By	y: Chad Neptune Checked By:
Date (MM/DD/YY)	Time (24 hr)	Method (pump, surge, bail)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (Lpm)	Temp (°C)	Specific Conductivity (mS/cm)	рН	DO (mg/L)	Turbidity (NTU)	Sediment (mL/L)	Comment
6/20/18	1050	P	-	65	.56gp	21.6	491.1	7,40	4.22	>1000		
	1055	9		67	Stepm	21.5	484,1	7.46	4.23	71000	-	
	1100	P	_	70	.56gom	21.5	477.1	2.51	4.21	>1000		Stop for 2085
	1120	P		80	. Stopm		476. (	7.64	3.38	1000		resume
	1130	P		3	31					51/150		Stopfor Tets.
	(335	P	116.76'	80	· 6590m	15,0	481.3	7.51	3.08	21000	_	resume
	1345	· P	•	86	-65 10m	21.6	489.2	7,16	3.75	>1600		
	1350	P	-	89	.650/m	21.6	479,3	7.15	4.02	>1000	-	
	1355	P	-	93	,65g/m	21.7	467,9	7.21	4.15	7/000	-	
	1400	P	-	98	.65 g/m	21.6	452.9	7.32	4.19	71000	-	
	1405	P	-	101	,6590m	246	449,2	7,37	4,28	71000	_	
	1410	P	-	104		21,5	445,9	7,42	4.34	7/000	-	
	1415	P	,-	107	168 ann	21.5	441.7	7.46	4.31	71000	-	- Parker Dameste
	1420	P	-	1/1	,65g/m	21.5	441.3	7.49	4.24	71000		
	1425	"P	-	114	15gm	21.5	443.1	7,49	421	71600	-	DECEMBER SHEET
	1430	P	_	118	1650M	21.6	443.5	7,49	4.19	7/000	STATE OF THE PERSON	
- U	1435	P		122	.65gom	21.6	432.7	7.50	4.19	21000	~	
	1446	0	-	128		21.6	457.3	7,50	421	21000	-	
CV2	1450	þ	-	135	.65cpm	21.6	435,4	7,49	4.18	>1000	-	THE RESERVE OF THE PARTY OF THE
9	1500	P	-	142		21.6	432,6		4,11	71000	_	
	1515	P	-	146	,399 pm	220	4390			31000		
	1517	P	111.18	146	-	_	-"	-	-		_	Reset tubrig.
	1520	P	111.18	146'	~75gpm	22.0	438.6	7.56	3.95	>1000		resume /
	1536	P	1-	154	.75 Hours	21.6	450,0	7,43	4.07	71000	-	lots of Fine San
	1540	P		162	,75mpm	21,6			4.17	71000	-	
1	1605	9	-	185	25 0 PM		452.0	7,47		71000		
V	61.0	0	_	190	1356 PM	21.6						Stop for the dew
121/18	1016	pt		190	+682er	25.1	494.0	7.63	515	399	~	Stop for the day
1011	1540	10	-	206	.688in		469,3		4.27	>1100	-	
	.0 1	r		-10	4/10			1115	11-1			

#### **Monitoring Well Development Form**

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LOCATION	Site:	equa AI				Loci	D: F	TA-	M	W01				Date:	6/1	9/18
LOCATION	Project Na	me: PF	C-5I			Proj	ect Num	ber: 60	55	20893	.3.2		I	Recorde	ed By	r. C. Wegitu webecked By:
	Developm	ent Equipment:	Wat	ena	55 B	tile	V.5	5 Bu	13	e blo	de		74747	1421274.74.74	1414141	
EQUIPMENT	Water Lev	el Indicator Type		lust			Wa	ater Quali	y Met	er Type:	YSI.	BURA				
	PID Type/	ID#: -	-NA								agui					
	Casing ID	(inches) [a]:	222		Ur	it Casin	g Volum	e (gallon/	linear	foot) [b]: (	3,16	Initial	Dep	th to W	ater (f	FT BTOC) [c]: 110,73
WELL INFO	Total Well	Depth (FT BTO	C) [d]: 14	5, 741				ckness (F				Well	Volur	me (gall	lon) {[	[d-c] x b}: 2.4352
	Ground Co	ondition of Well:						-6-								
CASING	Casing ID	(inches) [a]:	*******	//////////////////////////////////////		1.5	2.0	2.2	3.0	4.0	4.3 5.	0 6.0	7	.0	8.0	Ambient PID (ppm):
INFO	Unit Casin	ng Volume (gal/li	near foot) [b]:			0.09	0.16	0.20	0.37	0.65	0.75 1.	0 1.5	2	.0	2.6	Well Head PID (ppm):
Date (MM/DD/YY)	Time (24 hr)	Method (pump, surge, bail)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (Spm)	Te	mp C)	Specif Conduct (mS/cr	ic ivity n)	рН	DO (mg/L)	Turbidity (NTU)	1	Sedime (mL/L	ent -)	Comment
6/2/18	1106	PLUMO	_=	224	.689	2140	1.6	465		7,50	4.38	713		-		
	1115	ound	_	231	.68	21	.6	453	4	7,51	4.42	694			-	
	1145	191	-	241	,68	21	6	451.	2	7,51	4.39			A	_	
		١٥		252	.68	21.	6	449		7.52	4.32	562	1	-		
	1155	'p		255	.68	2/	7	448,		7.51	4.28	548		~		
	1200	p		259	,68	21	,6	442.	-	7,51	434			-		
	1205	P	-	252	.68	21	.6	447.		7.50	4.37					
	1210	\psi	-	285	168	21	.6,	446	8	7.51	4.40		-			
	n15	'ρ		268	168	21	.6	446	.8	7.50		11:00	4	~		
	1225	9		271	,68	4	+	445	8	7.50	4,32		-	_		
	1230	P		275	168	21		11111	1	7, 49	4,38	410	-			
		0		282	168	21		444	5	7,49	4.50	369				
	1235	16		285	.68	21.	5	20.1	5	7.49	436	308		there-	_	Lunch Break
	12:45	6	_	298	-69	21-		441.	-	7.49	4,40	292				LANCO DIENE
-	12:50	12		292	68	21	-	444		7.49	4.43	249	+	_		
	12:55	10		2,95	.68	TU		441		7:49	4.39	249	1			
	1500	P		299	.68	_	-	442		7.49	4.39	234	T	_	1	
	1305	0		302	.69	21		444		7.49	4.43	250		_		
	1510	P		305	.68			442.		7-49	4.42	248		-		
	315	B	-	309	.64	_		442		7.49	4.36	240				

#### **Monitoring Well Development Form**

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LOCATION	Site: F	vasuo 1 ame: PF	9NG C-SI							100		2		Date	: 6/ orded By:	21/18 CKN Checked By:
EQUIPMENT	Developm Water Lev PID Type/	ent Equipment: rel Indicator Type ID#:	Wafe	yra n.3 f	55 B	the first that the same	Wa	SS ater Qual	Su. ity Met	RABARARARARA	Bloch VSI	2	Pro			
WELL INFO	Total Well	(inches) [a]: 2 Depth (FT BTO ondition of Well:		1				ne (gallon ckness (F		foot) [b]:	0.16					TBTOC)[c]: 110,73' d-c]xb]: 2.4352
CASING INFO		(inches) [a]: ng Volume (gal/li	none foot) (b):		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1.5 0.09	2.0	2.2	3.0 0.37	4.0 0.65		5.0	6.0	7.0	8.0 2.6	Ambient PID (ppm): Well Head PID (ppm):
Date (MM/DD/YY)	Time (24 hr)	Method (pump, surge, bail)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (spm)	Te	mp C)	Speci Conduc (mS/c	fic tivity	pH	DO (mg/L	W.W.W.	Turbidity (NTU)	******	liment	Comment
6/21/18	1320	fun p	-	312	-68		.6	441.		7.49	4.3	_	252	-		
	1325	jung		319	168	21	6	441		7,49		10	253	-	-	
	1335	9	Stage .	322	,68	21	.6	440		7.50	4.4		221		-	
	1340	P	-	325	.68		7	446		7.50			216	-	_	
	1345	!	-	328	68	21	.6	439.		7.49	4.4	_	210	*		
	13 50	P		332	.69	21.		444		7.49	4.6	2	196	-		
	1355	ρ		335	.68		.6	741		7.49	4.5	7	186	-		
	1400	P	Name and Associated States	342	-68	21	.6	441	- 1	7.49	4.5	7	156	IN	1,4	
	1405	0	~	345	168	21	6	440	u	7.48	4.5	0	130	104		
V	1415	þ	-	348	,68	21	7	438	9	7.48	4,52		132	102		
	1410			V 1 0	,,,,,					,,,,,						
												_				
										411 2 777		1				
												+	_		-	
(41)												+				
												+				

AECOM 6/18/18

#### **Monitoring Well Development Form**

LOCATION	Site: Eu	usw	Fresv	10-A1	UG	Loci	D: 10	15-	n	100	1			Date	: 6/1	18/18
LOCATION	Project Na	me: PFC	-SI			Proje	ect Num	ber: 60	05	2089	3.3,2			Reco	orded By	r: Checked By:
QUIPMENT	Developm Water Lev	ent Equipment: el Indicator Typ	Watery e/ID#: 55	ns+			Wa	iter Quali	ty Mei	er Type:	VSI	Pn	>			
	PID Type/I						Equ	uipment [	Decon	Ligui	nox	3	Sta	ge		
WELL	Total Well	(inches) [a]: 2 Depth (FT BTC andition of Well:	OC) [d]: /32,	55'			y Volum	e (gallon	/linear	foot) [b]: 6 c]: 16,0	1.16		Initial C	epth to	Water (	(FT BTOC) [c]: 116, 5 41 [d-c] x b]: 2, 56 16
	**************			200020000000000000000000000000000000000		**********			MANA M		*********	12022		12.00.00.00.00		A-phi-set RID (sees)
CASING INFO		(inches) [a]: g Volume (gal/l	inear foot) [b]:			1.5 0.09	2.0 0.16	0.20	3.0 0.37			5.0	6.0 1.5	7.0	8.0 2.6	Ambient PID (ppm): Well Head PID (ppm):
Date (MM/DD/YY)	Time (24 hr)	Method (pump, surge, bail)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (Lpm)	Te	mp C)	Special Conduction (mS/c)	fic tivity	рН	DO (mg/L)	•	urbidity (NTU)	Sed	iment nL/L)	Comment
6/18/18	1340	Bail	116.54	3.5	0.85	-	_	_		_	_		-		~	Henry Sediment load TD 133.52
	1355	Surge	121.15'		-	-		_		-	-		_			TD 133.52
	1418	Bail	منت	10	1	100		_			_		_	7-		4-0-4-1
	142/2	Surge	120.59	_	_			-	_		-	-	_		_	
	1451	Bar		19	1	-	-				-				_	
	1523	Surge	117.20		-			-				1		-		
	154+	Bail	7	29			_							*		
1/10/0	1633	Stopfor										-				50-10064
6/19/18	0710	Puchap	116.6/4"			-			-			_				TD=134.94
-	6745	stop						-	-			-		-		
	-	Ourno											A.A.			, , , , , , , , , , , , , , , , , , , ,
	0845	enne		33	.5490	2075	9	84.0	,	7.45	6.69	>	1000	1		
	0900	PUMP		339	15401	23	3	1137		7.46			1000			
X ANA	0911	Pump	133.58	45	,5490	n 23	8	1475		7.62			1000		÷	Wellown pool Pa
	0933	pusp	117.00	45	.4959	am 2	3.6	1036	5	7.61	6,27	- "	1000			Stod rumpad Pa Stod rumping, la Well recovery
	0941	P		49	14950	Pen 1	3.6	1010	)	7.52	6.15		1000			Well recovert
	0952	ρ		53	199560	Wa 20	5,6	176		7,34	5.16		1000	-		
TAUTI -	1002	9		58	.49500	m 23	.5	950		7.33	5.15		1000			1
	1012	P	133.00	62	49 ga	1 23	,5	1128		7.42	4.66	9	173			Well Pumped Pres
	1034	19	(17.001		1			1,4-4-			the sale					n the following criteria for 3 consecutive

LOCATION	Site:Fresr	no Air National C	Guard	LocID: /	45-m	1001			Date: 6/18/18				
LOCATION	Project Na	ame: FANG - Pf	FC SI				mber:6052089		Jaket -		Recorded By: Chad Neptune Checked By:		
Date (MM/DD/YY)	Time (24 hr)	Method (pump, surge, bail)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (Lpm)	Temp (°C)	Specific Conductivity (mS/cm)	рН	DO (mg/L)	Turbidity (NTU)	Sediment (mL/L)	Comment	
5/19/18	1631	P		65		om 25.3	1142	7,61	5.16	321		AND DAY WAS IN	
	1044	P		67	,4920	23.9	894	7.17	5.29	293			
	1053	P		72	,499pm	23.9	842	207	5.06	>1000			
1	1058	P		74	,499 pm	23.7	834	7,10	4.78	71000			
	1103	P		77	,57pm		860	7.11	4.88	914			
	1110	P		80	Sapm	23,6	879	7.20	4.62	366			
	1115	P	TETA	83	. 54 PM	23,7	872	7.25	4,43	225		The United States	
	1120	P		85	.sgpm	23.7	827	7,30	4.56	173			
	1125	P		88	5 arm	23.8	880	7.36		333			
	1130	P		90	.59pm	23.8	890	7.40		115			
	1135	P		92	5Gplan	23.8	964	7,45	5,00	169			
	1140	P		95	,59pm	23.8	987	7.51	4.83	134		0	
V	1141			a	7,							Wall purped day	
		38 1/51	1-1-1									Fin Blech perelopment.	
												sevelsoment.	
												7	
	The last										1		
AKIN T													
		- 17			100								
								-0.5					
			-										
3980													
7/3								1	p-1				
			19 35	2774					1	No.			
			THUR										
									-				
		DE LOS		L. OT									
					12			7					

LOCATION	Site: FV	esno Apame: PCF	NG			Loci		10 - N							6/2		
LOCATION	Project Na	ame: PCF	SI			Proj	ect Num	nber: 60	5	20893	.3.2	1240404040	***********	Recor	rded By	CKN	Checked By:
	Developm	ent Equipment:	55 Baila	~,55	Surge	e Blo	Block, Waterra pump, Solnist Sounder										
EQUIPMENT	Water Lev	el Indicator Typ	e/ID#: 50/V	55#/2.	514	16	Wa	ater Qualit	ty Me	ter Type:	YSI	evo;	160	ote	di-	turbid	to Weter
NAME OF THE PERSON OF THE PERS	PID Type/	ID#: NA			20000000000000000000000000000000000000	53-52-60-60-60-60-60-60-60-60-60-60-60-60-60-	Equipment Decon: Lyuvax								anananan		/
	Casing ID	(inches) [a]:	220		Ur	nit Casin	g Volum	ne (gallon/	linear	foot) [b]:	0.16		Initial Depth to Water (FT BTOC) [c]: 1/3. 37				
WELL	Total Well	Depth (FT BTC	OC) [d]: 132		W	ater Colu	ımn Thic	ckness (F	T) [d-	c]: 18.	53		Well Vo	lume (g	allon) {[	[d-c] x b}: 2	9648
	Ground Co	ondition of Well:	Openar	ound													
CASING	Casing ID	(inches) [a]:	,			1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0	Ambient Pl	ID (ppm):
INFO	Unit Casir	ng Volume (gal/l	linear foot) [b]:	50000000000000000000000000000000000000	000000000000000000000000000000000000000	0.09	0.16	0.20	0.37	0.65			1.5	2.0	2.6	Well Head	PID (ppm):
Date (MM/DD/YY)	Time (24 hr)	Method (pump, surge, bail)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate		mp C)	Specif Conduct (mS/cr	ic ivity n)	рН	DO (mg/L	) Ti	urbidity (NTU)	Sedi (ml	ment JL)		Comment
122/18	2926	Bass	113.77	0.0	, 26		_		_		_	-		_		Begin	n Developmen
	1012	Surge	114.30	12		-					_	_		_			,
	1023	Bati		12	.26	_						-	_			10150	Sand
	1053	Sarge	114.99	20	~	_					-					7 1	100
	1104	Bail		20	134						-			•		Co 15 0	of sand
	1154	Smyle	114,90	37					_					_		(16	7
	1211	Bout	11816	37		_							_		_	Cotset	Sand
6/24/18	1300		113.77	55 55	,9		10000				Section 1						the day.
6/21/10	1145	puinp	113.71	60	19	18	a	123.	7	7.49	5.09	7	~	154	7	Instr.	11 waterra
	1155	10		6.9	10			126.8		7,49	4.5%		06 06	15).	6		-
	1200	4	_	69	9	18.		132,0		7.44	4.30		100	149	7		
	1205	0		73	,9	181		138	7	7.47	-		1100		1,0		
	12.10	0	_	78	19	18,		151.0	9	7.51	4.5		1100				
	1215	A	terior	82	19	18		161.	7	7,61	4.6	17	1100		05		
	1220	U <sub>2</sub>	_	87	19	18		153,	-	7.61	4.48		1100	136	, 3		
	1225	9	-	91	19	18.		150.		7.61	4,20		1100	132			
	1230	P		96	1.0	18.	8	145.	_	7.60	4,2		כסן	130	1		
	1235	P		101	1.0	18,		143.		7.62	4.11		100	128			
	1240	P	_	106	4.0	181	3	144.		7.61	4.4	-	87	126	,7		
	1245	0	and the second	111	1.0	18	8	142,0		7.58	4,41						ritoria for 3 consequitive

DEVELOPMENT CRITERIA: Measurements: every 5 minutes; Development is considered complete if water added during boring and well construction is removed and parameters are within the following criteria for 3 consecutive readings: ± 1°C, ± % Conductivity; ± 10 hr pH; Turbidity ± 10 NTU for 30 minutes or < 50 NTU and sediment <0.75 mL/L

30/0

100/0

ORP±10mV



#### **Monitoring Well Development Form**

Page Pof 2

LOCATION	Site:Fresn	o Air National (	Guard	LocID: / C	0-MW	01			Date: 6/25/18				
LOCATION	Project Na	ame: FANG - P	FC SI				mber:60520893	3.3.2			Recorded By: Chad Neptune Checked By:		
Date (MM/DD/YY)	Time (24 hr)	Method (pump, surge, bail)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate	Temp (°C)	Specific Conductivity (mS/cm)	pН	DO (mg/L)	Turbidity (NTU)	Sediment (mL/L)	Comment	
6/25/18	1250	P	_	116	40	18.8	143,9	7.58	4.66	785	125.5		
	1253	2	1	121	1,0	18.8	144,6	7.68	4,60	724	124.6		
	1300	10	_	126	1.0	1819	144.7	7.58	4,68	687	123.0		
	1305	b	-	131	1.0	18.9	142,2	7.58	4,74	620	122.1		
	1310	1p	-	136	1.0	18.9	140.8	7.59	4.70	588 569	120,7		
	1315	p	-	1/1/1	10	18,9	141.0	7,57	4.62	569	120.2		
	1320	P		146	1,0	18.9	141.2	7.56	4,62	576	119:9		
	1323	1			25/2011							Stup	
												The second second	
	11.3	C PARTY COLOR	THE STATE OF										
										200		PARALLER L	
			Tree star										
	-				1,50				3 3		C C	The Board of the Control	
			Traffin I	111-11				0.2.11					
				1.00								The Street Land	
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E HET IN									10.00				
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								3.00					
and the same			-			0.10					4.65		
			7772				HITCH IN				100		
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								A Department	The residence				

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Page 1 of

LOCATION	Site: F	resuo - 1	ANG			LOCID: FTA-MW07						29/18		
LOOAHOR	Project Na	ame: PFE	-51	***********		Project Num	ber: 605	2089	3,3.2		Recorded By	CKN	Checked By:	
EQUIPMENT	Sampling Water Lev PID Type/		imp: <b>6</b> E D pe/ID#: 5 lo	micrope INA	g pung		ter Quality Met	er Type: 🦊		NPSO onde ID: 19 3 bucke	1020061	Compressor: 5 Ha	ndset ID: 17C162741	
WELL & SAMPLING INFO	CARROLL STREET, AND STREET, AN	on: ump Settings: of Well/Comme	NA ents:	100000000000000000000000000000000000000	Screen Inte	erval (BTOC): /	20-130			r (BTOC): 11 TOC): 120				
Date (MM/DD/YY)	Time (24 hr)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (Lpm)	Temp (°C)	Specific Conductivity (mS/cm)	DO (mg/L)	рН	ORP (mV)	Turbidity (NTU)	Pump Refill/ Discharge (seconds)	Pump Pressure (PSI)	Comment	
6/29/18	6750	110.80	0.0	240.2							20/20	150		
	0805	110.80	3,06	,2	22,7	488.5	5.81	6.96	276,4	28,4	10/20	150		
	0810	110.86	4.02	.2	22.4	490.8	3.93	7.16	271.3	71.1	10/20	150		
	0815	118.80	502	:2	22.7	489.7	3,88	7.19	266.1	6812 53,2	10/20	150	Sampled	
	4													
2													*	
Sample ID Nu	mbers and	Sample Time			Cont	tainer Count, \	/olume & Type		gs: ±0.5°C, ±3 Preservative		y; ± 10% DO; ± 0		ORP; Turbidity as low as possible	
FR-F	S/ngs		6820		6	x 250 y	ul Hop	E	NA					
					M(q Es	District S			التي عيمًا	10				

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4					7
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Page 1 of

LOCATION	Site: F	regno A	106			LociD: 145-WW01						Date: 6/26/18			
LOUATION	Project Na	ame: PFC	-SI		***************************************	Project Num	ber: 6652	084	3.3.2	No de la constanta de la const	Recorded By	CKN	Checked By:		
EQUIPMENT	The second secon	Equipment - Pu vel Indicator Typ			5 pwog	Wa	iter Quality Mete	r Type: 🆊			D 100615	Compressor: H	andset ID: 19010294		
W.000000000000000000000000000000000000	PID Type/	/ID#:	***************************************	************		Equ	uipment Decon:	LOBI	rinox	*************	************				
MELLO	Description	on:			Screen Inte	en Interval (BTOC): 135-115' Initial Depth to Water (BTOC): F					6.68	Ambient PID (ppm):			
WELL & SAMPLING	Historic P	ump Settings:	NA					Pump	Inlet Depth (B	TOC): 120	9 185	Well Head	PID (ppm):		
INFO	Condition	of Well/Comme	ents: New	/		6/14									
	NOTE:														
Date (MM/DD/YY)	Time (24 hr)	Depth to Water (BTQ€)	Volume Removed (gallens)	Pumping Rate (Lpm)	Temp (°C)	Specific Conductivity (mS/cm)	DO (mg/L)	рН	ORP (mV)	Turbidity (NTU)	Pump Refill/ Discharge (seconds)	Pump Pressure (PSI)	Comment		
1/26/18	1232	116.63	8.0	1	_			_			10/10	130			
1	1245	116,68	1,24	LASON C			3.34	7,36	177.1	176	10/20	130			
	1250	116.68	2.26	0.2	27.4		4.59	7.35	173.9	172	10/20	130			
	1257	116.68	3.66	0.2	27.1	991	4.60	7.36	164,9	74.6	10/20	130			
	1302	116,68	4,66	0.2	26.3	985	4.10	7.30	2 164.4	89.9	10/20	136			
	130+	116,68	5.66	0.2	27.1	991	4.04	7.34	164.1	73.5	10/20	136			
	13/2	116,68	6.62	6.2	27.2	987	4.07	7.33	777	5412	10/20	130	2 1 1		
	1317	116.68	7.62	0.2	27.0	979	4.11	7.30	16611	45,6	10/20	130	Sampled		
Pumping Rate: _ Sample ID Nu			every 3 - 5 minutes	s; Stabilization			r three consecut /olume & Type		gs: ± 0.5°C, ± 3  Preservative		y; ± 10% DO; ± 0		ORP; Turbidity as low as pos		
FR-10	15-N	1001)	FR-145	MWOOL			m L H	OPE	nov	ne					
		;20			11/2		10								
					1000	Y management	Aprilyra to		Marin A						
						117 - 12									

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LOCATION	Site: F	vesuo-	ANG			LocID: 100	-mw	7 1			Date: 6/	29/18			
LOCATION	Project Na	me: PFC	-SI			Project Numb	er: 605	2689	3.3.2	-	Recorded By	r	Checked By:		
EQUIPMENT	Water Lev	Equipment - Purel Indicator Typ	e/ID#. 5/0 p	work /NA	epurge	Wate	er Quality Mete	er Type: 🗸		onde ID: [	70 100615	Compressor: Ha	ndset ID: 170 1027 9		
	PID Type/	ID#. NA	<b>-</b>				pment Decon:	Color	in wox	560	icket				
WELL &	Description				Screen Inte	erval (BTOC):	13-133		epth to Wate			Ambient PID (ppm):			
SAMPLING	-	ump Settings:	NA			173-133 Pump Inlet Depth (BTOC): 123' Well Head PID (ppm): —									
INFO	NOTE:	of Well/Comme	nts:								<u> </u>				
D./		Donth to	Volume	Bumping	T -	Specific	Γ	***********	T	I 11 II	Dump Rofill/	Duma			
Date (MM/DD/YY)	Time (24 hr)	Depth to Water (BTOC)	Removed (gallons)	Pumping Rate (Lpm)	Temp (°C)	Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Pump Refill/ Discharge (seconds)	Pump Pressure (PSI)	Comment		
6/29/18	0983	113.75	0.06	.2-	_		-	_	-		10/20	158			
	0938	113.75	3.02	.26	26.2	\$ 160.8	5,31	7,70	7.2	196	10/20	150			
	1003	113.75	4.06	,2	23.5	112,7	6.19	7.31	1925	153	10/20	150			
-	1008	113.75	5,06	12	22.4	112,7	5.84	7,36	190,9	132	10/20	150			
	1018	113,75	7.0L	,2	22.5	113,0	5,87	7.35		92.9	10/20	150	Saurled		
	10.0	1.9.75					0.0	12.00	10 110		(0100		or only and		
			very 3 - 5 minutes	; Stabilization									ORP; Turbidity as low as possi		
Sample ID Nur	Contract Line Contract		1			ainer Count, Vo			Preservative		Parame	ter(s)	i		
FR-	100 -	MWOI	/1018		(2)	(250 m	INVE		None						
					-			- 19							
									***************************************						
					ON THE REAL	Hos		D/RXT		LEF					

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LOCATION	Site: F	res vo A	HVG				FMW-				Date: 6/	27/18		
LOCATION	Project Na	ame: PFC-	-SI	************	**********	Project Numb	oer:6052	6893	3,2		Recorded By	CKN	Checked By:	
***********	Sampling	Equipment - Pu	mp: QED	1-M701	BOLVO	re	**************	С	ontroller: M	1950	(	Compressor:		
EQUIPMENT	Water Lev	el Indicator Typ			A	Wat	er Quality Mete	r Type: 🖊	SI S	onde ID:	Q 1701001	515 Ha	indset ID: 17-0102	
	PID Type/	ID#: -	/				ipment Decon:					handada a a a a a a a a a a a a a a a a a		
<u> </u>	Description	on:			Screen Inte	erval (BTOC): 🗸	Inkrown	Initial De	epth to Water	r (BTOC):	16.50	Ambient Pli	D (ppm):	
WELL & SAMPLING			NA			Pump Inlet Depth (BTOC): 128-80 Well Head PID (ppm):								
INFO	Condition	of Well/Comme	nts:							mate of				
	NOTE:													
Date (MM/DD/YY)	Time (24 hr)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (Lpm)	Temp (°C)	Specific Conductivity (mS/cm)	DO (mg/L)	pН	ORP (mV)	Turbidity (NTU)	Pump Refill/ Discharge (seconds)	Pump Pressure (PSI)	Comment	
127/18	1108	115:50	0.06	6.2L				-	-	_	10/20	140		
	1115	119,50	1,42	0.26	27.7	494	4.31	7.21	152,6	71100	10/20	140		
	1120	115,50	2,46	0.2	25.0	484.2	5,03	7.28	146.	71100	10/20	140		
	1125	115,50	3.46	6,2	25.3	477.2	5,10	7.28	141.6	71100	10/20	140		
	1130	115,50	4.42	6.2	24.9	456.1	4.87	7.33	133.5	71100	10/10	140		
	1135	115.50	SILL	612	25.2	470.5	4.62	7.29	134,2	965	10/20	140		
	1140	115.50'	6.42	0,2	25,1		4,76	7.44	132,4	572	10/20	140		
	1145	115,50	7.46	0.2	25,2	446.5	4.59	7.40	134.4	441	10ho	140		
	1156	115.50	8,46	0.2	25.2	461.5	5,01	7.36	136.7	299	10/20	140		
	1155	115,50	9,47	0.1	24.9	466,2	5.77	7.46	(3),8	199	10/20	140	- 11	
	1200	115,50	10,41	6,2	25,0	4486	4.88	1.51	129,2	146	10/20	140	Sam pleel	
	100		very 3 - 5 minutes	s; Stabilization				49			AND COMPANY OF THE PARTY OF THE		ORP; Turbidity as low as	
Sample ID Nur		•	1			tainer Count, V			Preservative		Paramet	ter(s)		
FR-L	IF MI	W-46B	1/1200		2	x 250 m	O LABA	E	NA		-			
1121	1, 1,10					-								
						-								

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A			

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Campling E Vater Leve VID Type/II Description distoric Pu Condition of	el Indicator Typ D#. <i>A. A.</i> n:	mp: <b>Q</b> E D e/ID#: 5/	Micro ope/N	A	Project Num		0893 Co	ontroller: W	1950		CHN Compressor:	Checked By:		
Campling E Vater Leve VID Type/II Description distoric Pu Condition of	Equipment - Pu el Indicator Typ D#: AUA n: mp Settings:	mp: <b>Q</b> E D e/ID#: 5/	Micro ope/N	A	Wa	ter Quality Mete	Co	ontroller: W	1950	[ 0	Compressor:			
Vater Leve VID Type/II Description distoric Pu Condition of	el Indicator Typ  D#. AJA  n:  mp Settings:	e/ID#. 51	Micro ope/N	A	Wa									
Vater Leve VID Type/II Description distoric Pu Condition of	el Indicator Typ  D#. AJA  n:  mp Settings:	e/ID#. 51	ope/N	A	Wa									
Description distoric Pur Condition of	n: mp Settings:							Water Quality Meter Type: 45L Sonde ID: 170 100615 Handset ID: 17002 4						
listoric Pu Condition o	mp Settings:	a 1A		C	000000000000000000000000000000000000000	Equipment Decon: Libratus x								
listoric Pu Condition o	mp Settings:	AIA		ocreen inte	nterval (BTOC): Un known Initial Depth to Water (BTO			(BTOC): /2	0.33.	Ambient PID (ppm):				
	of Well/Comme	11//	Historic Pump Settings: A / A								40 Well Head PID (ppm):			
	A MONITORINE	nts:												
NOTE:														
		***************************************						****************	000000000000000000000000000000000000000	*******************				
Time (24 hr)	Depth to Water (BTOC)	Volume Removed (gallons)	Pumping Rate (Lpm)	Temp (°C)	Specific Conductivity (mS/cm)	DO (mg/L)	рН	ORP (mV)	- Turbidity (NTU)	Pump Refill/ Discharge (seconds)	Pump Pressure (PSI)	Comment		
899	120.33'	6.02	-	-		-	-			-				
824	120,33	25002L	0.26	23.2	239.9	4.17	7.62	185.8	7,42	10/20	145	191		
834	120,33'	2.0L	0,26	22.8	216.9	3.24	7.60	176,6	8.31	10/20	145			
	120.33	14.0L	0.2	22,7	215,4	3,28	7.53	177.6	8.94		195			
844	120,23	5.02	6.2	23,7	195.4	3.03	7.64	163.6	7.21	10/20				
849	120.33	6,6L	0.2		202.5	3,99	7,71	155.8	10.4	10/26	145			
854	120.33'		0.2		215,6		726		14,2	10/20	145			
859	120,35	8,06				3.45			16.0		145	1		
904	120,33'	9.01	0,2	22.8	217.3	3,30	4,77	146.2	17.9	10/20	145	Sampled		
51 /min: Me	asuroments: e	very 3 - 5 minutes	: Stabilization	ie defined as	the following fo	r three consecut	vo readings	• +0.5°C +3	% Conductivity	r + 10% DO: + 0	1 nH: + 10mV	OPP: Turbidity as low as		
		160		0			-				-	-		
( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	Time (24 hr) 89 839 839 849 859 860 860 860 860 860 860 860 860 860 860	Time (24 hr) Depth to Water (BTOC)  89	Time (24 hr) Depth to Water (8TOC) (gallone)  80 (20.33' 6.01  824 (20.33' 3.01  834 (20.33' 3.01  839 (20.33' 3.01  844 (20.33' 5.61  849 (20.33' 6.61  859 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01  869 (20.33' 7.01	Time (24 hr) Depth to Water (24 hr) Water (BTOC) (gallone) Rate (Lpm)  89 120.33 26.21 0.2 L  834 126.33 3 26.21 0.2 L  839 120.33 3 4.0 L 0.2 L  849 120.33 6.6 L 0.2  849 120.33 6.6 L 0.2  859 120.33 7.0 L 0.2  859 120.33 7.0 L 0.2  869 120.33 7.0 L 0.2  879 120.33 7.0 L 0.2	Time (24 hr) Depth to Water (BTOC) Removed (gallone) Rate (Lpm) (°C)  89	Time Depth to Water (24 hr) Pumping Removed (24 hr) Pumping Removed (24 hr) Pumping Rate (14 hr) Pumping Rate (15	Time Depth to Water (24 hr) Water (BTOC) (gallone) Rate (Lpm) (C) Conductivity (mS/cm) (mg/L) (mg/L) (Lpm) (C) Conductivity (mg/L) (mg/	Time Depth to Water (BTOC) Removed (gallone) Pumping Temp (°C) Conductivity (mS/cm) PH (24 hr) PH (20.33' O.OL	Time   Depth to   Water   Removed   (gallone)   (Lpm)   CC)   Conductivity   (mg/L)   pH   ORP   (mW)      120.33	Time (24 hr)   Depth to Water (34 hr)   Pumping Rate (Lpm)   Conductivity (mS/cm)   DO (mg/L)   pH (mV)   Turbidity (NTU)      120.33   16.01	Depth to   Volume   Pumping   Temp   Specific   DO   mg/L   pH   ORP   Turbidity   Pump Refill   Discharge   (gallone)   (Lpm)   (C)   Conductivity   (mg/L)   pH   ORP   (mV)   (NTU)   Discharge   (seconds)   (seconds)   (seconds)   (seconds)   (seconds)   (mg/L)   (mg/L)   (mg/L)   pH   ORP   (mV)   (NTU)   Discharge   (seconds)   (secon	Time Depth to Volume Removed (24 hr) Rate (25 hr) Removed (gallone) Rate (Lpm) Rate (Lpm		

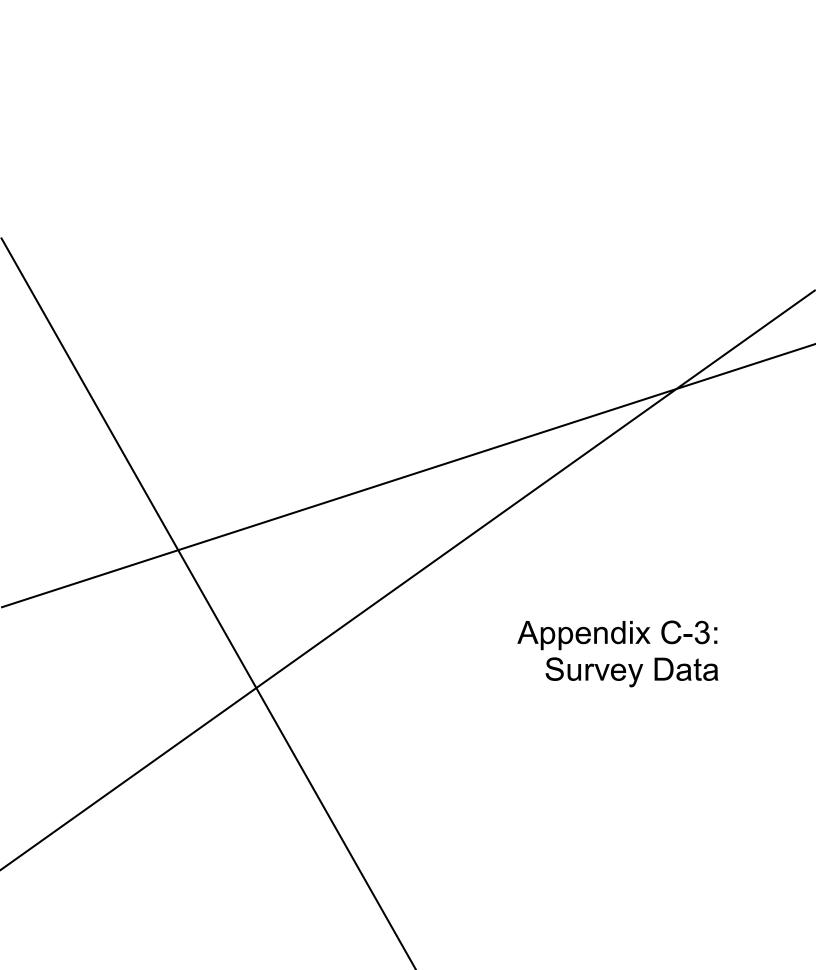
FR-MWBROGC/0909 2x150 ML HOPE NA -

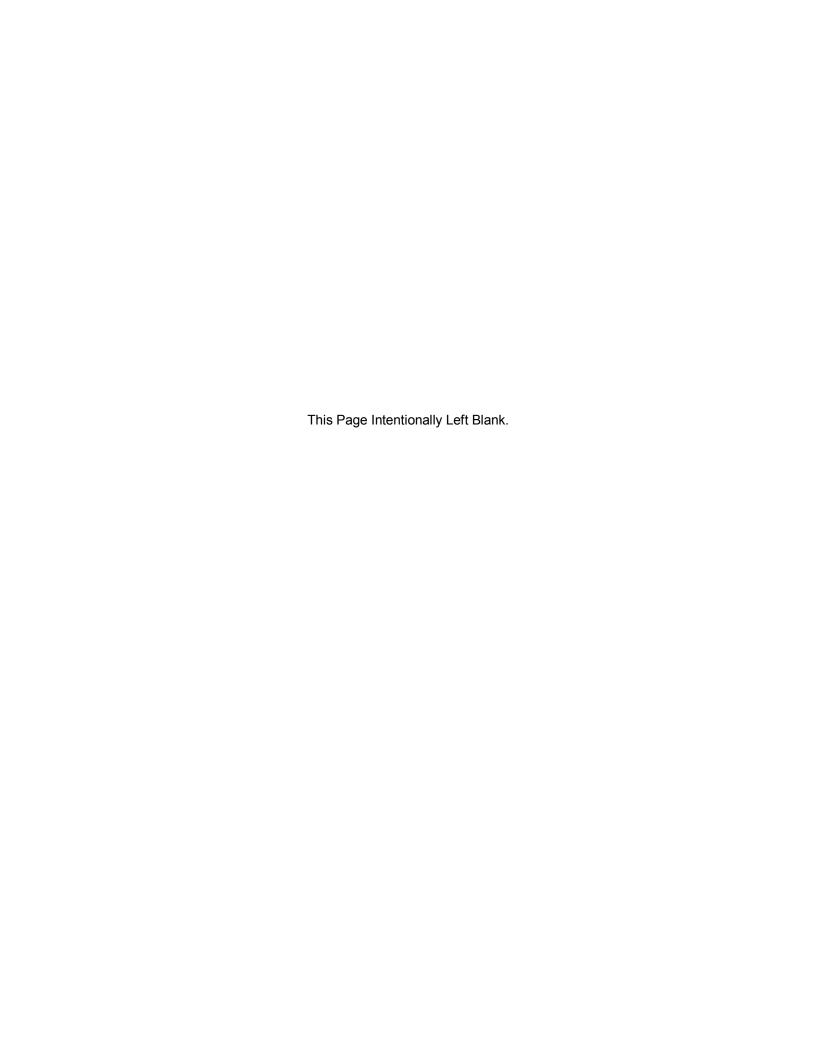
### Surface Water/Sediment Sample Collection Form

Page 1 of

LOCATION	Site: FRESNO Project Name: PFC ANG					LociD:			Dale: 3/28/18			
						Project Numbe	n 605208	93.3.2	Recorded By: CR.E Checked By:			
QUIPMENT	LIVERS CONTRACTOR OF THE PARTY	ty Meter Type Decon: ///	4.66	보고 (리 리 리 리 리 리 리 리 리 리 리 리 리 리 리 리 리 리 리	en-g-lehalistist	Sampling Equipment N/A (9146)						
OTHER FORMATION	NOTE: 9 Location D	rab sa escription: sp	mple of igot on	N. sile	Source of lail	2 water 135	~15' W.	ot bildes n	Ambi	ent PIC	(ppm): <b>N/A</b>	
Date (MM/DD/YY)	Time (24 hr)	Temp (°C)	Specific Conductivity (mS/cm)	DO (mg/L)	рН	ORP (mV)	Turbidity (NTU)		Comment			
								OPE				
newalahan kentula	eranan sa tatan	a hamana a saanaha	tresters outs received a	noshi intensini na och	gengapapaenean	onanietosentela		— O-C	national material and an increase and the	00.04(46)	oraniara osara mananiara daga karipaki	
xample: near oservations).	oy construction  for precipitation  for ce	n has silted up n has occurred	waterway) - for sirecently, note da	sediment samp ays since last ra	le, describe ain.	sediment (clay	, silt, dayey sand, silt	y sand, mix of clay sand	derate, rapid]; color, odor, s and gravel, etc.,] and note	any oc	lor, staining, or other	
example: near bservations).	oy construction  for precipitation  for ce	n has silled up has occurred	waterway) - for sirecently, note da	sediment samp ays since last ra	le, describe ain.	sediment (clay	, silt, dayey sand, silt	y sand, mix of clay sand	and gravel, etc.,] and note	any oc	lor, staining, or other	

Sample ID Numbers and Sample Time	Container Count, Volume & Type	Preservative	Parameter(s)		
ID: F-Source Water-03.28.2018	(2) 250 ml HDPE bother	None	PFOA, PFO3, PFNA, PFH A STEN		
Time: 0917					
OLE	- 10E	O.E.	<i>Q</i> E		







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August 22, 2018

18-4822

### AECOM - Air National Guard, 144th Fighter Wing 5323 E McKinley Avenue, Fresno, CA 93727 Monitoring Well Land Survey Measurements

### Off-Site Benchmark

NGS point "FAT MON 1" (PID: AA4530), An aluminum disk located on a 12" concrete pad flush with the ground, in the centerline of an airport service road, due East of the Air National Guard fire station. (Elevation = 327.3' NAVD 88) See www.ngs.noaa.gov for more information. (See Photo #4)

### Site Benchmark

An ink "X" on top of the concrete curb to the South of the corridor between the Air National Guard's Operation and Security buildings. The mark is located on the North side of an access road approximately 10 feet east of a walkway that runs North. (Elevation = 325.548' NAVD 88). (See Photo #5)

### **Monitoring Well Data**

Vertical Datum:

NAVD 88

Horizontal Datum: NAD-83 (2011 Epoch)

Note: The horizontal datum was established by processing static GPS baselines from CRSC stations

" MUSB" and "P307", to each monitoring well. See http://csrc.ucsd.edu/ for more information.

SPC: State Plane Coordinates are NAD 1983, California Zone 4 (2011 Epoch)

### 145-MW01

Latitude Lonaitude 36° 46' 01.11734" N

119° 42' 32.88620" W

(See photo 1)

SPC Northing: 2,163,097.440 feet SPC Easting: 6,353,959.539 feet

SED LAND SURVEY OR

#### Measured Elevations

A)

Interior Casing Rim:

327.504

B) Exterior Casing Rim: 327.837

C) Ground 327.734

#### 100-MW01

Latitude

36° 45' 54.80818" N

Longitude

119° 42' 29.57872" W

(See photo 2)

SPC Northing: 2,162,457.432 feet

SPC Easting: 6,354,223.931 feet

#### Measured Elevations

A) Interior Casing Rim: 325.778

Exterior Casing Rim: B)

326.129'

C) Ground 325.952

Michael S. Hartley, PLS . President

Peter Mayne, PLS . Vice President

David O. Hartley, RCE • CFO

helle

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### FTA-MW01

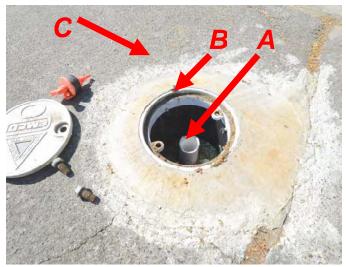
Latitude 36° 45′ 57.60126″ N Longitude 119° 42′ 16.61637″ W

(See photo 3)

SPC Northing: 2,162,732.128 feet SPC Easting: 6,355,280.648 feet

### Measured Elevations

A) Interior Casing Rim: 328.046' B) Exterior Casing Rim: 328.973' C) Ground 328.976'



This picture is an example. Each well is unique.

### **Description of Measurements**

- A- Measured the elevation of the North rim of the interior well casing. The measurement position was marked using a black sharpie The well casing plug was removed prior to the measurement.
- B- Measured the elevation of the Exterior rim casing, North of, and in line with the location of the interior casing measurement.
- C- Measured the elevation of the ground surface North of the casing, typically asphalt or dirt surface.

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### **Photos**



Photo 1: 145-MW01 facing North on August 17, 2018



Photo 2: 100-MW01 facing South on August 17, 2018



### **Photos Continued**



Photo 3: FTA-MW01 facing South on August 17, 2018



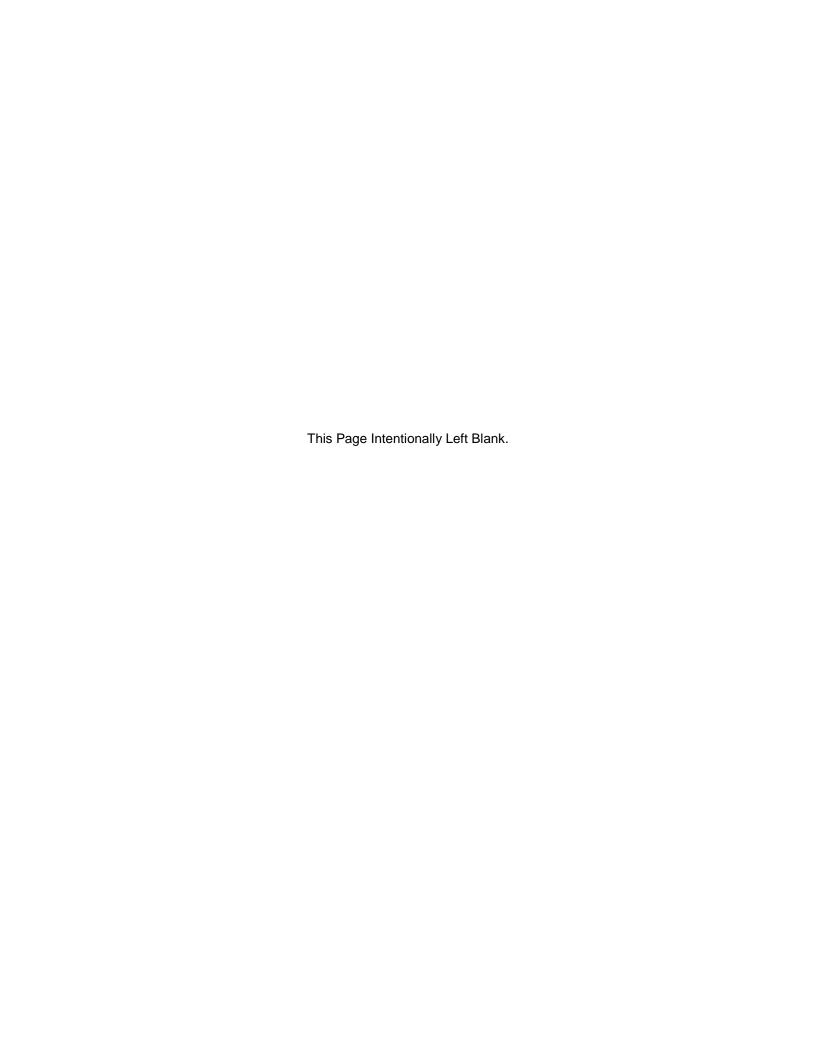
Photo 4: Off-Site Benchmark, NGS point "FAT MON 1" (PID: AA4530), facing Northwest. (Elevation = 327.3' NAVD 88)

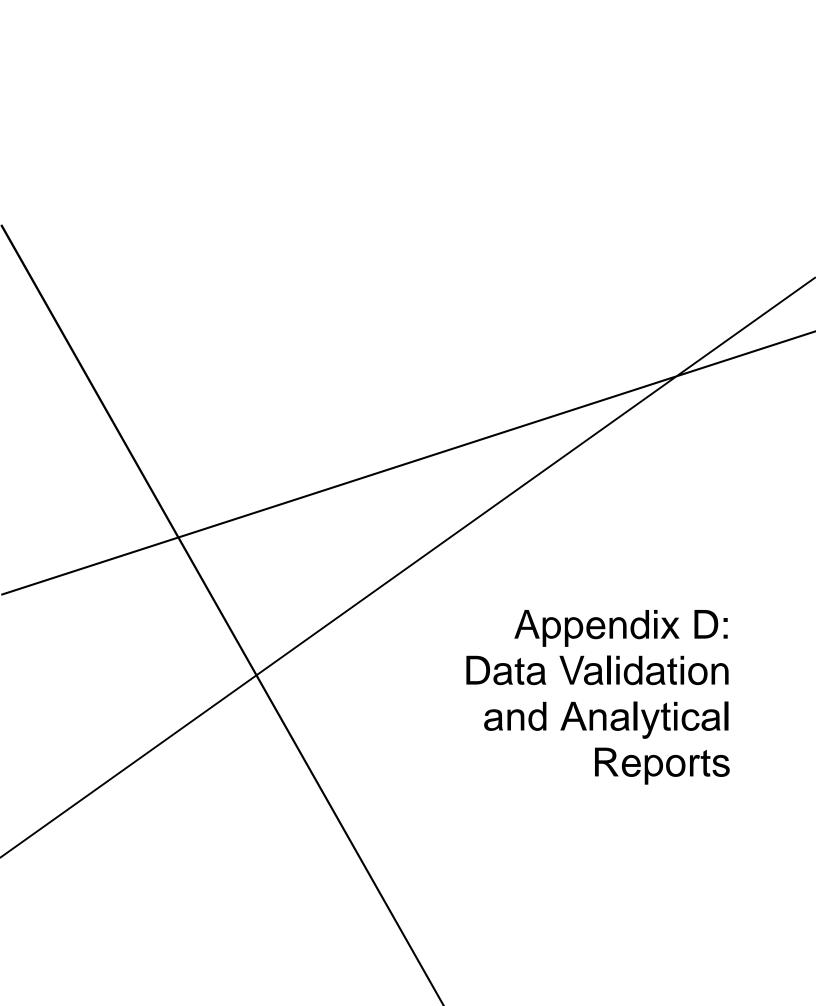


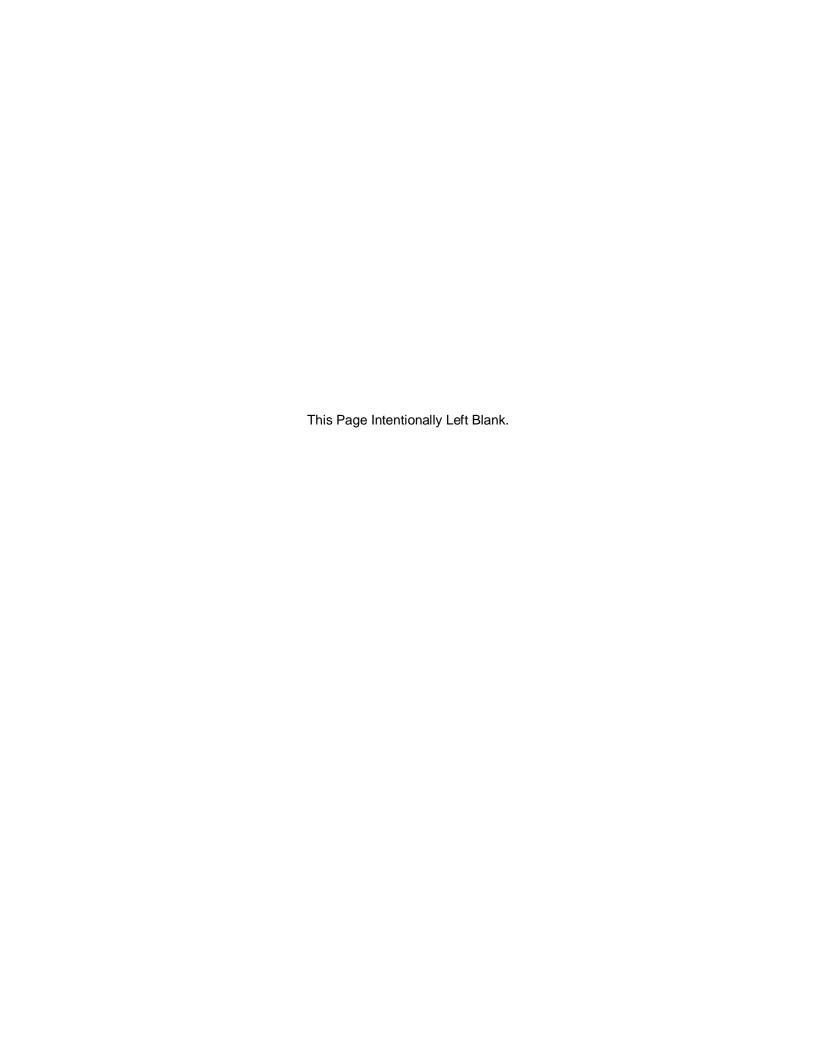
### **Photos Continued**



Photo 5: Site Benchmark, facing North on August 22, 2018. (Elevation = 325.548' NAVD 88)







#### **DATA VALIDATION REPORT - Level II Review**

SDG No.:	FSA84, FSB08, FSB10, FSB11, & FSB26	Analysis:	Per and Polyfluorinated Alkyl Substances				
Laboratory:	Eurofins	Project: _	ANG PFAS – Fresno				
Reviewer:	Victoria Kirkpatrick	Date: _	July 26 <sup>th</sup> , 2018				

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied, data review worksheets, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the specifics of the analytical method referenced and provisions of the approved project-specific QAPP; and, qualified according to the USEPA CLP National Functional Guidelines for Organic and Inorganic (August 2016) Superfund Data Review, with the exception of the "B" flag for blank qualifications only, as stated on the EPA Region III website. Modifications reflect the level of review requested, the specifications of the project-specific QAPP, and the specifics of the analytical methods employed.

Major

**Anomalies:** None.

Minor

**Anomalies:** During the PFAS analysis, the source water sample, submitted in sample delivery group

(SDG) FSA84, displayed detections greater than the detection limit (DL) for the

following:

Analyte	Concentration (ng/L)
Perfluorobutanesulfonate	4.1
Perfluoroheptanoic acid	2.0
Perfluorohexanesulfonate	9.5
Perfluoro-octanesulfonate	6.3
Perfluorooctanoic acid	3.2

The positive associated field sample and equipment blank results that displayed detections less than five times the concentrations found in the source water were qualified U,x. When appropriate, the quantitation limits were elevated to the concentrations detected. The following equipment blanks displayed detections greater than the DL:

Blank ID	Analyte	Concentration (ng/L)
	Perfluorobutanesulfonate	4.2
	Perfluoroheptanoic acid	1.8
FR-EB-Pump-062618	Perfluorohexanesulfonate	9.9
	Perfluoro-octanesulfonate	8.3
	Perfluorooctanoic acid	2.8
	Perfluorobutanesulfonate	3.9
FD FD Done 043410	Perfluoroheptanoic acid	1.5
FR-EB-Rope-062618	Perfluorohexanesulfonate	9.5
	Perfluoro-octanesulfonate	6.8
FR-EB-Rope-062618	Perfluorooctanoic acid	2.3
	Perfluorobutanesulfonate	4.0
FR-EB-Sounder-062618	Perfluoroheptanoic acid	1.7
	Perfluorohexanesulfonate	9.4

Blank ID	Analyte	Concentration (ng/L)
FR-EB-Sounder-062618	Perfluoro-octanesulfonate	7.5
FR-ED-Southuet-002010	Perfluorooctanoic acid	2.1
	Perfluorobutanesulfonate	4.0
	Perfluoroheptanoic acid	1.5
FR-EB-Tube-062618	Perfluorohexanesulfonate	9.3
	Perfluoro-octanesulfonate	7.4
	Perfluorooctanoic acid	2.0

The equipment blank results and associated field sample results were previously qualified due to detections in the source water used in the equipment blanks; no further data qualifying action was required. The following matrix spike pairs (MS/MSD) displayed percent recoveries outside the quality control (QC) limits of 70%-130% and relative percent differences (RPD) greater than the upper QC limit of 30%:

Parent Sample	QC Batch	Analyte	MS Recovery (%)		RPD (%)
FR-APR-SB04-1	18144015	Perfluorohexanesulfonate	-27	-198	64
FR-APR-3B04-1	18144015	Perfluorooctanoic acid	321	-181	119
FR-OF1-SD01	18191003	Perfluorobutanesulfonate	109	135	19
FR-FTA-MW01	18184008	Perfluoro-octanesulfonate	146	96	16

The positive parent sample result associated with the percent recovery less than the lower QC limit for perfluorohexanesulfonate was qualified J-,m. The positive parent sample result associated with the combination of high and low percent recoveries for perfluorooctanoic acid was qualified J,m. The positive parent sample result associated with the remaining percent recoveries greater than the upper QC limits was previously qualified due to a source water detection. The laboratory control spike (LCS) prepared in batch 18141012, displayed percent recoveries for perfluoroheptanoic acid and perfluorooctanoic acid greater than the upper QC limit of 130% at 133% for both. The associated field sample results were non-detect; no data qualifying action was required. The following field duplicate pairs displayed relative percent differences (RPDs) for perfluoro-octanesulfonate greater than the upper QC limit of 50% or differences greater than four times the limit of quantitation:

Parent Sample	RPD (%)	Delta
FR-APR-SB01-5	60.9	5.6
FR-145-SB02-5	198.1	338.4
FR-157-SB02-1	76.2	16

The positive associated field duplicate results were qualified J,f.

During the moisture analysis, the following laboratory duplicates displayed RPDs greater than the upper QC limit of 5%:

Parent Sample	Batch	<b>RPD</b> (%)
FR-145-SB03-1	18142820005A	9
FR-APR-SB01-5D	18142820005B	7
FR-FTA-SB01-1	18144820006A	17

The positive associated field sample results were qualified J,b.

Correctable Anomalies:

None.

**Comments:** 

On the basis of this evaluation, the laboratory appears to have followed the specified method, with the exception of anomalies discussed previously. If a given fraction was not discussed, all quality control criteria reviewed were within acceptable limits. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed:

Victoria Kirkpatrick

## Fresno

**Job:** 60520893 Laboratory: Eurofins

SDG#: FSA84, FSB08, FSB10, FSB11, & FSB26

				1 3	B11, & FSB2	0
SDG	Sample ID	Client ID	Sample Type	Sample Date	Matrix	PFOA/ PFOS
FSA84	9536572	F-Source Water - 03.28.2018	Field Sample	03/28/18	Aqueous	Χ
FSB08	9618849	FR-EB-051618	Equipment Blank	05/16/18	Aqueous	Χ
FSB08	9618850	FR-145-SB03-1	Field Sample	05/16/18	Soil	Χ
FSB08	9618851	FR-145-SB03-5	Field Sample	05/16/18	Soil	Х
FSB08	9618852	FR-145-SB01-1	Field Sample	05/17/18	Soil	Χ
FSB08	9618853	FR-145-SB01-5	Field Sample	05/17/18	Soil	Χ
FSB08	9618854	FR-APR-SB01-1	Field Sample	05/17/18	Soil	Χ
FSB08	9618855	FR-APR-SB01-5	Field Sample	05/17/18	Soil	Χ
FSB08	9618856	FR-APR-SB01-5D	Field Duplicate	05/17/18	Soil	Χ
FSB08	9618857	FR-FRB-051718	Rinsate Blank	05/17/18	Aqueous	Χ
FSB08	9618859	FR-APR-SB03-1	Field Sample	05/18/18	Soil	Χ
FSB08	9618860	FR-APR-SB03-5	Field Sample	05/18/18	Soil	Χ
FSB10	9623953	FR-FTA-SB03-1	Field Sample	05/21/18	Soil	Χ
FSB10	9623954	FR-FTA-SB03-5	Field Sample	05/21/18	Soil	Χ
FSB10	9623955	FR-FTA-SB02-1	Field Sample	05/21/18	Soil	Χ
FSB10	9623956	FR-FTA-SB02-5	Field Sample	05/21/18	Soil	Χ
FSB10	9623957	FR-FTA-SB02-5D	Field Duplicate	05/21/18	Soil	Χ
FSB10	9623958	FR-FTA-SB01-1	Field Sample	05/21/18	Soil	Х
FSB10	9623959	FR-FTA-SB01-5	Field Sample	05/21/18	Soil	Х
FSB10	9623960	FR-100-SB01-1	Field Sample	05/21/18	Soil	Χ
FSB10	9623961	FR-100-SB01-5	Field Sample	05/21/18	Soil	Χ
FSB10	9623962	FR-104-SB02-1	Field Sample	05/21/18	Soil	Χ
FSB10	9623963	FR-104-SB02-5	Field Sample	05/21/18	Soil	Χ
FSB10	9623964	FR-104-SB01-1	Field Sample	05/21/18	Soil	Χ
FSB10	9623965	FR-104-SB01-5	Field Sample	05/21/18	Soil	Χ
FSB10	9623966	FR-145-SB02-1	Field Sample	05/21/18	Soil	Χ
FSB10	9623967	FR-145-SB02-5	Field Sample	05/21/18	Soil	Χ
FSB10	9623968	FR-145-SB02-5D	Field Duplicate	05/21/18	Soil	Χ
FSB10	9623969	FR-APR-SB02-1	Field Sample	05/22/18	Soil	Χ
FSB10	9623970	FR-APR-SB02-5	Field Sample	05/22/18	Soil	Χ
FSB10	9623971	FR-APR-SB04-1	Field Sample	05/22/18	Soil	Χ
FSB10	9623974	FR-APR-SB04-5	Field Sample	05/22/18	Soil	Χ
FSB10	9623975	FR-APR-SB05-1	Field Sample	05/22/18	Soil	Χ
FSB10	9623976	FR-APR-SB05-5	Field Sample	05/22/18	Soil	Χ
FSB10	9623977	FR-157-SB02-1	Field Sample	05/22/18	Soil	Χ
FSB10	9623978	FR-157-SB02-1D	Field Duplicate	05/22/18	Soil	Χ
FSB10	9623979	FR-157-SB01-1	Field Sample	05/22/18	Soil	Χ
FSB10	9623980	FR-157-SB01-5	Field Sample	05/22/18	Soil	Χ

## Fresno

Eurofins Laboratory: **Job:** 60520893

FSA84, FSB08, FSB10,

SDG#: FSB11, & FSB26

SDG	Sample ID	Client ID	Sample Type	Sample Date	Matrix	PFOA/ PFOS
FSB11	9623981	FR-157-SB03-1	Field Sample	05/22/18	Soil	Χ
FSB11	9623982	FR-157-SB03-5	Field Sample	05/22/18	Soil	Χ
FSB11	9623983	FR-FRB-052218	Rinsate Blank	05/22/18	Aqueous	Χ
FSB11	9623984	FR-157-SB02-5	Field Sample	05/22/18	Soil	Χ
FSB26	9686219	FR-EB-Rope-062618	Equipment Blank	06/26/18	Aqueous	Χ
FSB26	9686220	FR-EB-Pump-062618	Equipment Blank	06/26/18	Aqueous	Χ
FSB26	9686221	FR-EB-Sounder-062618	Equipment Blank	06/26/18	Aqueous	Χ
FSB26	9686222	FR-EB-Tube-062618	Equipment Blank	06/26/18	Aqueous	Χ
FSB26	9686223	FR-145-MW01D	Field Duplicate	06/26/18	Groundwater	Χ
FSB26	9686224	FR-145-MW01	Field Sample	06/26/18	Groundwater	Χ
FSB26	9686225	FR-MWBP-09C	Field Sample	06/27/18	Groundwater	Χ
FSB26	9686226	FR-HFMW-46B	Field Sample	06/27/18	Groundwater	Χ
FSB26	9686227	FR-FTA-MW01	Field Sample	06/29/18	Groundwater	Χ
FSB26	9686230	FR-100-MW01	Field Sample	06/29/18	Groundwater	Χ
FSB26	9686231	FR-FRB-1-062918	Rinsate Blank	06/29/18	Aqueous	Χ
FSB26	9686232	FR-OF4-SD01	Field Sample	06/29/18	Sediment	Χ
FSB26	9686233	FR-OF4-SD01D	Field Duplicate	06/29/18	Sediment	Χ
FSB26	9686234	FR-OF1-SD01	Field Sample	06/29/18	Sediment	Χ

Client Sample ID: FR-APR- FR-APR- SB01-5-D

Date Sampled: 5/17/18 5/17/18

	Units	LOQ	5X LOQ	Samp		Dupilo Con	cate	% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Substances											
Perfluorobutanesulfonate	ng/g	0.77	3.85	0.40	J	0.61	J	41.6%	0.21	3.1	Pass
Perfluoroheptanoic acid	ng/g	0.77	3.85	0.22	J	0.34	J	42.9%	0.12	3.1	Pass
Perfluorohexanesulfonate	ng/g	0.77	3.85	2.7		5.2		63.3%	2.5	3.1	Pass
Perfluoro-octanesulfonate	ng/g	0.77	3.85	6.4		12		60.9%	5.6	3.1	Fail
Perfluorooctanoic acid	ng/g	0.77	3.85	0.20	J	0.38	J	62.1%	0.18	3.1	Pass

**Control limit** [sample]>5xLOQ use 50%

[sample]<5xLOQ use Delta<4xLOQ

Client Sample ID: FR-FTA- SB02-5 SB02-5-D

Date Sampled: 5/21/18 5/21/18

Sample **Duplicate** Pass/ 5x **4**x Units LOQ % RPD Delta Conc Conc Fail Perfluorinated Alkyl Substances Perfluoroheptanoic acid ng/g 0.84 4.2 0.69 0.88 24.2% 0.19 3.4 Pass Perfluorohexanesulfonate ng/g 0.84 4.2 9.5 12 23.3% 2.5 3.4 Pass Perfluorooctanoic acid ng/g 0.84 4.2 17 17 0.0% 0.0 3.4 Pass

> Client Sample ID: FR-145- FR-145-SB02-SB02-5 5-D Date Sampled: 5/21/18 5/21/18

Sample Duplicate Pass/ 4x 5x LOQ % RPD Units Delta Fail LOQ Conc Conc LOQ Perfluorinated Alkyl Substances Perfluoroheptanoic acid 0.84 4.2 0.84 U 26.8% 0.26 3.4 Pass ng/g 1.1 Perfluorohexanesulfonate ng/g 0.84 4.2 0.24 3.5 174.3% 3.26 3.4 Pass Perfluorononanoic acid 0.84 4.2 0.84 U 0.36 80.0% 0.48 3.4 Pass ng/g 3.4 Perfluoro-octanesulfonate 4.2 340 198.1% 338 Fail ng/g 0.84 1.6 Perfluorooctanoic acid ng/g 0.84 4.2 0.84 U 3.0 112.5% 2.16 3.4 Pass

> Client Sample ID: FR-157- FR-157-SB02-SB02-1 1-D

Date Sampled: 5/22/18 5/22/18

	Units	LOQ	5x LOQ	Samp Cond	-	Duplica Conc	te	% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subst	ances										
Perfluorohexanesulfonate	ng/g	0.76	3.8	0.35	J	1.1		103.4%	0.75	3.0	Pass
Perfluorononanoic acid	ng/g	0.76	3.8	1.4		0.86		47.8%	0.54	3.0	Pass
Perfluoro-octanesulfonate	ng/g	0.76	3.8	29		13		76.2%	16	3.0	Fail
Perfluorooctanoic acid	ng/g	0.76	3.8	0.26	J	0.54	J	70.0%	0.28	3.0	Pass

**Control limit** [sample]>5xLOQ use 50%

[sample]<5xLOQ use Delta<4xLOQ

Client Sample ID: FR-145- MW01 MW01D

Date Sampled: 6/26/18 6/26/18

	Units	LOQ	DX LOQ	Conc	Conc	% RPD	Delta	LOQ	Fail
Perfluorinated Alkyl Subst	tances				•				
Perfluorobutanesulfonate	ng/g	170	850	4500	3400	27.8%	1100	680	Pass
Perfluoroheptanoic acid	ng/g	17	85	370	300	20.9%	70	68	Pass
Perfluorohexanesulfonate	ng/g	17	85	1600	1300	20.7%	300	68	Pass
Perfluorooctanoic acid	na/a	17	85	13 I	11 I	16.7%	2 0	68	Pass

Client Sample ID: FR-OF4- SD01 SD01D

Date Sampled: 6/29/18 6/29/18

	Units	LOQ	5x LOQ	Samp Con		Duplicate Conc		% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subst	ances										
Perfluorobutanesulfonate	ng/g	0.76	3.8	0.45	J	0.63	J	33.3%	0.18	3.0	Pass
Perfluoroheptanoic acid	ng/g	0.76	3.8	0.57	J	0.75	J	27.3%	0.18	3.0	Pass
Perfluorohexanesulfonate	ng/g	0.76	3.8	1.3	J	1.2		8.0%	0.10	3.0	Pass
Perfluorononanoic acid	ng/g	0.76	3.8	1.0		2.1		71.0%	1.1	3.0	Pass
Perfluoro-octanesulfonate	ng/g	0.76	3.8	16		18		11.8%	2.0	3.0	Pass
Perfluorooctanoic acid	ng/g	0.76	3.8	0.71	J	0.92		25.8%	0.21	3.0	Pass

Control limit [sample]>5xLOQ use 50% (35% Aqueous)

[sample]<5xLOQ use Delta<4xLOQ (2xLOQ Aqueous)

#### **DATA VALIDATION REPORT - Level II Review**

SDG No.:	FSA84, FSB08, FSB10, FSB11, & FSB26	Analysis:	Perfluorinated Alkyl Substances
Laboratory:	Eurofins	Project:	ANG PFAS – Fresno
Reviewer:	Victoria Kirkpatrick	Date:	July 25 <sup>th</sup> , 2018

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied, data review worksheets, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the specifics of the analytical method referenced and provisions of the approved project-specific QAPP; and, qualified according to the USEPA CLP National Functional Guidelines for Organic and Inorganic (August 2016) Superfund Data Review, with the exception of the "B" flag for blank qualifications only, as stated on the EPA Region III website. Modifications reflect the level of review requested, the specifications of the project-specific QAPP, and the specifics of the analytical methods employed.

#### Major Anomalies:

During the PFAS analysis, the following matrix spike pairs (MS/MSD) displayed percent recoveries outside the quality control (QC) limits of 70%-130% and relative percent differences (RPD) greater than the upper QC limit of 30%:

Parent Sample	QC Batch	Analyte	MS Recovery (%)	MSD Recovery (%)	RPD (%)
ED ADD CDOA 1	18144015	Perfluorohexanesulfonate	-27	-198	64
FR-APR-SB04-1	18144013	Perfluorooctanoic acid	321	-181	119
FR-OF1-SD01	18191003	Perfluorobutanesulfonate	109	135	19
FR-FTA-MW01	18184008	Perfluoro-octanesulfonate	146	96	16

The positive parent sample result associated with the percent recovery less than the lower QC limit for perfluorohexanesulfonate was qualified J-,m. The positive parent sample result associated with the combination of high and low percent recoveries for perfluorooctanoic acid was qualified J,m. The positive parent sample result associated with the remaining percent recoveries greater than the upper QC limits was previously qualified due to a source water detection.

### Minor Anomalies:

During the PFAS analysis, the source water sample, submitted in sample delivery group (SDG) FSA84, displayed detections greater than the detection limit (DL) for the following:

Analyte	Concentration (ng/L)
Perfluorobutanesulfonate	4.1
Perfluoroheptanoic acid	2.0
Perfluorohexanesulfonate	9.5
Perfluoro-octanesulfonate	6.3
Perfluorooctanoic acid	3.2

The positive associated field sample and equipment blank results that displayed detections less than five times the concentrations found in the source water were qualified

Page: 2 of 3

U,x. When appropriate, the quantitation limits were elevated to the concentrations detected. The following equipment blanks displayed detections greater than the DL:

Blank ID	Analyte	Concentration (ng/L)
	Perfluorobutanesulfonate	4.2
	Perfluoroheptanoic acid	1.8
FR-EB-Pump-062618	Perfluorohexanesulfonate	9.9
	Perfluoro-octanesulfonate	8.3
	Perfluorooctanoic acid	2.8
A STATE OF THE STA	Perfluorobutanesulfonate	3.9
ED ED Domo 062619	Perfluoroheptanoic acid	1.5
FR-EB-Rope-062618	Perfluorohexanesulfonate	9.5
	Perfluoro-octanesulfonate	6.8
FR-EB-Rope-062618	Perfluorooctanoic acid	2.3
	Perfluorobutanesulfonate	4.0
	Perfluoroheptanoic acid	1.7
FR-EB-Sounder-062618	Perfluorohexanesulfonate	9.4
	Perfluoro-octanesulfonate	7.5
	Perfluorooctanoic acid	2.1
	Perfluorobutanesulfonate	4.0
	Perfluoroheptanoic acid	1.5
FR-EB-Tube-062618	Perfluorohexanesulfonate	9.3
	Perfluoro-octanesulfonate	7.4
	Perfluorooctanoic acid	2.0

The equipment blank results and associated field sample results were previously qualified due to detections in the source water used in the equipment blanks; no further data qualifying action was required. The laboratory control spike (LCS) prepared in batch 18141012, displayed percent recoveries for perfluoroheptanoic acid and perfluorooctanoic acid greater than the upper QC limit of 130% at 133% for both. The associated field sample results were non-detect; no data qualifying action was required. The following field duplicate pairs displayed relative percent differences (RPDs) greater than the upper QC limit of 50% or differences greater than four times the limit of quantitation:

Parent Sample	Analyte	RPD (%)	Delta
FR-APR-SB01-5		60.9	5.6
FR-145-SB02-5	Perfluoro-octansulfonate	198.1	338.4
FR-157-SB02-1		76.2	16

The positive associated field duplicate results were qualified J.f.

During the moisture analysis, the following laboratory duplicates displayed RPDs greater than the upper QC limit of 5%:

Parent Sample	Batch	RPD (%)
FR-145-SB03-1	18142820005A	9
FR-APR-SB01-5D	18142820005B	7
FR-FTA-SB01-1	18144820006A	17

The positive associated field sample results were qualified J,b.

Correctable Anomalies:

None.

Page: 3 of 3

**Comments:** 

On the basis of this evaluation, the laboratory appears to have followed the specified method, with the exception of anomalies discussed previously. If a given fraction was not discussed, all quality control criteria reviewed were within acceptable limits. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed:

Victoria Kirkpatrick

# Fresno

Eurofins Laboratory: **Job:** 60520893

FSA84, FSB08, FSB10,

SDG#: FSB11, & FSB26

SDG	Sample ID	Client ID	Sample Type	Sample Date	Matrix	PFOA/ PFOS
FSA84	9536572	F-Source Water - 03.28.2018	Field Sample	03/28/18	Aqueous	Х
FSB08	9618849	FR-EB-051618	Equipment Blank	05/16/18	Aqueous	Х
FSB08	9618850	FR-145-SB03-1	Field Sample	05/16/18	Soil	Χ
FSB08	9618851	FR-145-SB03-5	Field Sample	05/16/18	Soil	Х
FSB08	9618852	FR-145-SB01-1	Field Sample	05/17/18	Soil	Х
FSB08	9618853	FR-145-SB01-5	Field Sample	05/17/18	Soil	Х
FSB08	9618854	FR-APR-SB01-1	Field Sample	05/17/18	Soil	Х
FSB08	9618855	FR-APR-SB01-5	Field Sample	05/17/18	Soil	Х
FSB08	9618856	FR-APR-SB01-5D	Field Duplicate	05/17/18	Soil	Х
FSB08	9618857	FR-FRB-051718	Rinsate Blank	05/17/18	Aqueous	Х
FSB08	9618859	FR-APR-SB03-1	Field Sample	05/18/18	Soil	Х
FSB08	9618860	FR-APR-SB03-5	Field Sample	05/18/18	Soil	Х
FSB10	9623953	FR-FTA-SB03-1	Field Sample	05/21/18	Soil	Х
FSB10	9623954	FR-FTA-SB03-5	Field Sample	05/21/18	Soil	Х
FSB10	9623955	FR-FTA-SB02-1	Field Sample	05/21/18	Soil	Х
FSB10	9623956	FR-FTA-SB02-5	Field Sample	05/21/18	Soil	Х
FSB10	9623957	FR-FTA-SB02-5D	Field Duplicate	05/21/18	Soil	Х
FSB10	9623958	FR-FTA-SB01-1	Field Sample	05/21/18	Soil	Х
FSB10	9623959	FR-FTA-SB01-5	Field Sample	05/21/18	Soil	Х
FSB10	9623960	FR-100-SB01-1	Field Sample	05/21/18	Soil	Х
FSB10	9623961	FR-100-SB01-5	Field Sample	05/21/18	Soil	Х
FSB10	9623962	FR-104-SB02-1	Field Sample	05/21/18	Soil	Χ
FSB10	9623963	FR-104-SB02-5	Field Sample	05/21/18	Soil	Х
FSB10	9623964	FR-104-SB01-1	Field Sample	05/21/18	Soil	Х
FSB10	9623965	FR-104-SB01-5	Field Sample	05/21/18	Soil	Х
FSB10	9623966	FR-145-SB02-1	Field Sample	05/21/18	Soil	Х
FSB10	9623967	FR-145-SB02-5	Field Sample	05/21/18	Soil	Х
FSB10	9623968	FR-145-SB02-5D	Field Duplicate	05/21/18	Soil	Х
FSB10	9623969	FR-APR-SB02-1	Field Sample	05/22/18	Soil	Х
FSB10	9623970	FR-APR-SB02-5	Field Sample	05/22/18	Soil	Х
FSB10	9623971	FR-APR-SB04-1	Field Sample	05/22/18	Soil	X
FSB10	9623974	FR-APR-SB04-5	Field Sample	05/22/18	Soil	Х
FSB10	9623975	FR-APR-SB05-1	Field Sample	05/22/18	Soil	Х
FSB10	9623976	FR-APR-SB05-5	Field Sample	05/22/18	Soil	Х
FSB10	9623977	FR-157-SB02-1	Field Sample	05/22/18	Soil	Х
FSB10	9623978	FR-157-SB02-1D	Field Duplicate	05/22/18	Soil	Х
FSB10	9623979	FR-157-SB01-1	Field Sample	05/22/18	Soil	Х
FSB10	9623980	FR-157-SB01-5	Field Sample	05/22/18	Soil	Х

## Fresno

Eurofins Laboratory: **Job:** 60520893

FSA84, FSB08, FSB10, SDG#:

FSB11, & FSB26

					,	
SDG	Sample ID	Client ID	Sample Type	Sample Date	Matrix	PFOA/ PFOS
FSB11	9623981	FR-157-SB03-1	Field Sample	05/22/18	Soil	Х
FSB11	9623982	FR-157-SB03-5	Field Sample	05/22/18	Soil	Χ
FSB11	9623983	FR-FRB-052218	Rinsate Blank	05/22/18	Aqueous	Х
FSB11	9623984	FR-157-SB02-5	Field Sample	05/22/18	Soil	Х
FSB26	9686219	FR-EB-Rope-062618	Equipment Blank	06/26/18	Aqueous	Χ
FSB26	9686220	FR-EB-Pump-062618	Equipment Blank	06/26/18	Aqueous	Х
FSB26	9686221	FR-EB-Sounder-062618	Equipment Blank	06/26/18	Aqueous	Х
FSB26	9686222	FR-EB-Tube-062618	Equipment Blank	06/26/18	Aqueous	Х
FSB26	9686223	FR-145-MW01D	Field Duplicate	06/26/18	Groundwater	Х
FSB26	9686224	FR-145-MW01	Field Sample	06/26/18	Groundwater	X
FSB26	9686225	FR-MWBP-09C	Field Sample	06/27/18	Groundwater	Χ
FSB26	9686226	FR-HFMW-46B	Field Sample	06/27/18	Groundwater	Х
FSB26	9686227	FR-FTA-MW01	Field Sample	06/29/18	Groundwater	Х
FSB26	9686230	FR-100-MW01	Field Sample	06/29/18	Groundwater	Х
FSB26	9686231	FR-FRB-1-062918	Rinsate Blank	06/29/18	Aqueous	Х
FSB26	9686232	FR-OF4-SD01	Field Sample	06/29/18	Sediment	X
FSB26	9686233	FR-OF4-SD01D	Field Duplicate	06/29/18	Sediment	Х
FSB26	9686234	FR-OF1-SD01	Field Sample	06/29/18	Sediment	Х

**Client Sample ID:** 

FR-APR- FR-APR-SB01-

SB01-5

5-D

Date Sampled:

5/17/18

5/17/18

	Units	LOQ	5x LOQ	Sampl Cond		Duplicate	Conc	% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subst	ances										
Perfluorobutanesulfonate	ng/g	0.77	3.85	0.40	J	0.61	J	41.6%	0.21	3.1	Pass
Perfluoroheptanoic acid	ng/g	0.77	3.85	0.22	J	0.34	J	42.9%	0.12	3.1	Pass
Perfluorohexanesulfonate	ng/g	0.77	3.85	2.70		5.20		63.3%	2.50	3.1	Pass
Perfluoro-octanesulfonate	ng/g	0.77	3.85	6.40		12.0		60.9%	5.6	3.1	Fail
Perfluorooctanoic acid	ng/g	0.77	3.85	0.20	J	0.38	J	62.1%	0.18	3.1	Pass

**Control limit** 

[sample]>5xLOQ use 50%

[sample]<5xLOQ use Delta<4xLOQ

Client Sample ID:

FR-FTA-SB02-5 FR-FTA-SB02-5-D

Date Sampled:

5/21/18

5/21/18

	Units	LOQ	5x LOQ	Sampl Conc	e	Duplicate Conc	% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subs										
Perfluoroheptanoic acid	ng/g	0.84	4.2	0.69	J	0.88	24.2%	0.19	3.4	Pass
Perfluorohexanesulfonate	ng/g	0.84	4.2	9.5		12	23.3%	2.50	3.4	Pass
Perfluorooctanoic acid	ng/g	0.84	4.2	17		17.0	0.0%	0.00	3.4	Pass

Client Sample ID:

FR-145- FR-145-SB02-

SB02-5 5/21/18 5-D 5/21/18

Date Sampled:

	Units	LOQ	5x LOQ	Samp Cond		Duplica Conc		% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subs	tances				•					•	
Perfluoroheptanoic acid	ng/g	0.84	4.2	8.0	U	1.1		26.8%	0.26	3.4	Pass
Perfluorohexanesulfonate	ng/g	0.84	4.2	0.2	J	3.5		174.3%	3.26	3.4	Pass
Perfluorononanoic acid	ng/g	0.84	4.2	0.8	U	0.36	J	80.0%	0.48	3.4	Pass
Perfluoro-octanesulfonate	ng/g	0.84	4.2	1.6		340		198.1%	338.4	3.4	Fail
Perfluorooctanoic acid	ng/g	0.84	4.2	0.84	U	3.0		112.5%	2.16	3.4	Pass

**Client Sample ID:** 

FR-157- FR-157-SB02-

SB02-1

1-D

Date Sampled:

5/22/18 5/22/18

	Units	LOQ	5x LOQ	Sample Conc	1.0	Duplicate Conc	% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subst	ances							7		-
Perfluorohexanesulfonate	ng/g	0.76	3.8	0.4	J	1.1	103.4%	0.75	3.0	Pass
Perfluorononanoic acid	ng/g	0.76	3.8	1.4		0.86	47.8%	0.54	3.0	Pass
Perfluoro-octanesulfonate	ng/g	0.76	3.8	29		13	76.2%	16.0	3.0	Fail
Perfluorooctanoic acid	ng/g	0.76	3.8	0.26	J	0.5 J	70.0%	0.28	3.0	Pass

**Control limit** 

[sample]>5xLOQ use 50%

[sample]<5xLOQ use Delta<4xLOQ

Client Sample ID:

FR-145-MW01

FR-145-MW01D

Date Sampled:

6/26/18

6/26/18

	Units	LOQ	5x LOQ	Sample Conc	Duplicate Co	nc % RPD	Delta	2x LOQ	Pass/ Fail
Perfluorinated Alkyl Subs	tances								
Perfluorobutanesulfonate	ng/g	170	850	4500.00	3400	27.8%	1100.00	340.0	Pass
Perfluoroheptanoic acid	ng/g	17	85	370	300	20.9%	70.00	34.0	Pass
Perfluorohexanesulfonate	ng/g	17	85	1600	1300	20.7%	300.00	34.0	Pass
Perfluorooctanoic acid	ng/g	17	85	13 J	11 J	16.7%	2.00	34.0	Pass

Client Sample ID:

FR-OF4-SD01 FR-OF4-SD01D

Date Sampled:

6/29/18

6/29/18

	Units	LOQ	5x LOQ	Sample	Conc	Duplicate	Conc	% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subs	tances			***************************************							-
Perfluorobutanesulfonate	ng/g	0.76	3.8	0.45	J	0.63	J	33.3%	0.18	3.0	Pass
Perfluoroheptanoic acid	ng/g	0.76	3.8	0.57	J	0.75	J	27.3%	0.18	3.0	Pass
Perfluorohexanesulfonate	ng/g	0.76	3.8	1.3	J	1.2		8.0%	0.10	3.0	Pass
Perfluorononanoic acid	ng/g	0.76	3.8	1		2.1		71.0%	1.10	3.0	Pass
Perfluoro-octanesulfonate	ng/g	0.76	3.8	16		18		11.8%	2.0	3.0	Pass
Perfluorooctanoic acid	ng/g	0.76	3.8	0.71	J	0.92		25.8%	0.21	3.0	Pass

**Control limit** 

[sample]>5xLOQ use 50% (35% Aqueous)

[sample]<5xLOQ use Delta<4xLOQ (2xLOQ Aqueous)

Client Sample ID:

FR-APR- FR-APR-SB01-

SB01-5

5-D

Date Sampled:

5/17/18

5/17/18

				0, 11, 13	•	U	•				
	Units	LOQ	5x LOQ	Sample Conc		Duplicate	Conc	% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subst	tances										
Perfluorobutanesulfonate	ng/g	0.77	3.85	0.40	J	0.61	J	41.6%	0.21	3.1	Pass
Perfluoroheptanoic acid	ng/g	0.77	3.85	0.22	J	0.34	J	42.9%	0.12	3.1	Pass
Perfluorohexanesulfonate	ng/g	0.77	3.85	2.70		5.20		63.3%	2.50	3.1	Pass
Perfluoro-octanesulfonate	ng/g	0.77	3.85	6.40		12.0		60.9%	5.6	3.1	Fail
Perfluorooctanoic acid	ng/g	0.77	3.85	0.20	J	0.38	J	62.1%	0.18	3.1	Pass

**Control limit** 

[sample]>5xLOQ use 50% [sample]<5xLOQ use Delta<4xLOQ

Client Sample ID:

FR-FTA-

FR-FTA-

Date Sampled:

SB02-5 5/21/18 SB02-5-D 5/21/18

	Units	LOQ	5x LOQ	Samp Cond	484, 864	Duplicate Conc	% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subs	tances									
Perfluoroheptanoic acid	ng/g	0.84	4.2	0.69	J	0.88	24.2%	0.19	3.4	Pass
Perfluorohexanesulfonate	ng/g	0.84	4.2	9.5		12	23.3%	2.50	3.4	Pass
Perfluorooctanoic acid	ng/g	0.84	4.2	17		17.0	0.0%	0.00	3.4	Pass

Client Sample ID:

FR-145-

FR-145-SB02-

Date Sampled:

SB02-5 5/21/18

5-D 5/21/18

	Units	LOQ	5x LOQ	Samp Cond		Duplica Cond		% RPD	Delta	4x LOQ	Pass/ Fail
Perfluorinated Alkyl Subst	tances										
Perfluoroheptanoic acid	ng/g	0.84	4.2	0.8	U	1.1		26.8%	0.26	3.4	Pass
Perfluorohexanesulfonate	ng/g	0.84	4.2	0.2	J	3.5		174.3%	3.26	3.4	Pass
Perfluorononanoic acid	ng/g	0.84	4.2	8.0	U	0.36	J	80.0%	0.48	3.4	Pass
Perfluoro-octanesulfonate	ng/g	0.84	4.2	1.6		340		198.1%	338.4	3.4	Fail
Perfluorooctanoic acid	ng/g	0.84	4.2	0.84	U	3.0		112.5%	2.16	3.4	Pass

Client Sample ID:

FR-157-

FR-157-SB02-

SB02-1

1-D

Date Sampled:

5/22/18

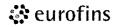
5/22/18 Sample Duplicate

	Units	LOQ	LOQ	Conc	1	Conc		/0 KFD	Della	LOQ	Fail
Perfluorinated Alkyl Substa	ances										
Perfluorohexanesulfonate	ng/g	0.76	3.8	0.4	J	1.1		103.4%	0.75	3.0	Pass
Perfluorononanoic acid	ng/g	0.76	3.8	1.4		0.86		47.8%	0.54	3.0	Pass
Perfluoro-octanesulfonate	ng/g	0.76	3.8	29		13		76.2%	16.0	3.0	Fail
Perfluorooctanoic acid	ng/g	0.76	3.8	0.26	J	0.5	J	70.0%	0.28	3.0	Pass

**Control limit** 

[sample]>5xLOQ use 50%

[sample]<5xLOQ use Delta<4xLOQ



# Analysis Report

2425 New Holland Pike, Lancester, PA 17501 = 717-656-2300 = Fax: 717-656-6756 + www.EurofinaUS.com/LanclabsEny

Sample Description:

F-Source Water - 03.28.2018 Water

Fresno PFC Phase II

**AECOM** 

**ELLE Sample #:** WW 9536572

**ELLE Group #:** 

1926405

Matrix: Water

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 03/31/2018 09:55 03/28/2018 09:17

SDG#:

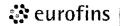
FSA84-01

CAT No.	Analysis Name	CA	S Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
Misc. (	Organics	EPA 537 mod ( table B-15	QSM 5.1	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	e 375	5-73-5	4.1	0.29	0.98	0.98	1
14434	Perfluoroheptanoic acid	375	5-85-9	2.0	0.29	0.98	0.98	1
14434	Perfluorohexanesulfonat	e 355	5-46-4	9.5	0.39	2.0	2.0	1
14434	Perfluorononanoic acid	375	5-95-1	N.D.	0.39	2.0	2.0	1
14434	Perfluoro-octanesulfonat	e 176	3-23-1	6.3	0.59	2.0	2.0	1
14434	Perfluorooctanoic acid	335	5-67-1	3.2	0.29	0.98	0.98	1
The la	aboratory's DoD Scope of	Accreditation does no	ot include the	e followina				

method: EPA 537 mod QSM 5.1 table B-15.

#### **Sample Comments**

		Labor	ratory :	Sample Analy	sis Recora		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18093009	04/12/2018 13:27	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18093009	04/03/2018 07:05	Pamela Rothharpt	1



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-666-2300 • Fax: 717-666-6766 • www.EurofineUS.com/LanclabsEny

**Sample Description:** 

FR-EB-051618 Water

PFC Phase II

**AECOM** 

ELLE Sample #: 1945536

WW 9618849

**ELLE Group #:** 

Matrix: Water

**Project Name:** 

Fresno Phase II

05/19/2018 10:00 05/16/2018 13:25 FSB08-01EB

Submittal Date/Time: Collection Date/Time: SDG#:

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/	MS Miscellaneous EF tal	PA 537 mod QSM 5.1 ble B-15	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.28	1.0	1.9	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.28	1.1	1.9	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.38	1,0	1.9	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.38	1.1	1.9	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.56	2.2	2.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.28	1,1	1.9	1

### **Sample Comments**

		Labo	ratory S	Sample Analy	sis Record		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141012	05/30/2018 03:13	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141012	05/21/2018 09:30	Robert Brown	1

<sup>\*=</sup>This limit was used in the evaluation of the final result

# Analysis Report

2425 New Moltand Pike, Lancaster, PA 17801 \* 717-656-2308 \* Fax: 717-556-6766 \* www.EurofinaUS.com/LancLabsEnv

**Sample Description:** 

FR-145-SB03-1 Soil

**PFC Phase II** 

**AECOM** 

**ELLE Sample #:** SW 9618850

**ELLE Group #:** 

1945536

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/19/2018 10:00 05/16/2018 15:40

SDG#:

FSB08-02

CAT No.	Analysis Name	CAS Number	Dry Resu	ılt	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/I	MS Miscellaneous EP tab	A 537 mod QSM 5.1 le B-15	ng/g		ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.48	J	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	1.2		0.21	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	3.4		0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	0.67	J	0.21	0,70	0,82	1
14478	Perfluoro-octanesulfonate	1763-23-1	84		0.21	0.67	0.82	1
14478	Perfluorooctanoic acid	335-67-1	0.43	J	0.21	0.70	0.82	1
Net Ch		l 2540 G-1997 Noisture Calc	%		%	%	%	
00111-	Moisture	n.a.	2.5	5,6	0.50	0.50	0.50	1

as-received basis.

### Sample Comments

Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016 -	05/31/2018 02:34	Marissa C Drexinger	1 .		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005A	05/22/2018 17:11	Scott W Freisher	1		

<sup>\*=</sup>This limit was used in the evaluation of the final result

# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 + 717-658-2300 + Fax: 717-666-6766 + www.EurofinaUS.com/LancLabsEnv

Sample Description:

FR-145-SB03-5 Soil

PFC Phase II

**AECOM** 

ELLE Sample #: 1945536

SW 9618851

**ELLE Group #:** 

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/19/2018 10:00 05/16/2018 16:00

SDG#:

FSB08-03

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS		PA 537 mod QSM 5.1 able B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.4	0.20	0.59	0.78	1
14478	Perfluoroheptanoic acid	375 <b>-85</b> -9	0.37 J	0.20	0.67	0.78	1
14478	Perfluorohexanesulfonate	355-46-4	9.8	0.20	0.63	0.78	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.67	0.78	1
14478	Perfluoro-octanesulfonate	1763-23-1	25	0.20	0.64	0.78	1
14478	Perfluorooctanoic acid	335-67-1	0.64 J	0.20	0.67	0.78	1
Wet Cl		M 2540 G-1997 Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	2.7	0.50	0.50	0,50	. 1
		ss in weight of the sample after					

103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

### **Sample Comments**

Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 02:49	Marissa C Drexinger	1		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1		

<sup>\*=</sup>This limit was used in the evaluation of the final result



## Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-656-2309 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-145-SB01-1 Soil

PFC Phase II

**AECOM** 

ELLE Sample #: SW 9618852

**ELLE Group #:** 

1945536

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/19/2018 10:00 05/17/2018 13:15

SDG#:

FSB08-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
_C/MS	/MS Miscellaneous EPA 5 table E	· - ·	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.0	0.20	0.61	0.82	1
14478	Perfluoroheptanoic acid	375-85 <b>-</b> 9	0.70 J	0.20	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	8.6	0.20	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	0.26 J	0.20	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	24	0.20	0.67	0.82	1
4478	Perfluorooctanoic acid	335-67-1	0.71 · J	0.20	0.70	0.82	1
Vet Ch		40 G-1997 ture Calc	%	%	%	%	
00111	Moisture	n.a.	3.3	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The m as-received basis.						,

### **Sample Comments**

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 03:05	Marissa C Drexinger	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1				



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax: 717-656-8765 • www.EurofinaUS.com/LancLabsEnv

**Sample Description:** 

FR-145-SB01-5 Soil

PFC Phase II

**AECOM** 

ELLE Sample #: SW 9618853

**ELLE Group #:** 

1945536

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/19/2018 10:00 05/17/2018 13:26

SDG#:

FSB08-05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table B		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.48 J	0.20	0.61	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	3.5	0.20	0.65	0.82	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	15	0.20	0.66	0.82	1
14478	Perfluorooctanoic acid	335-67-1	0.34 J	0.20	0.69	0.82	1
Vet Cl		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	4.7 .	0.50	0.50	0.50	- 1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.				American III - Marcaller III - II - II - II - II - II - II - I		

### **Sample Comments**

Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 03:20	Marissa C Drexinger	1		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1		

<sup>\*=</sup>This limit was used in the evaluation of the final result

# Analysis Report

. 2425 New Holland Pixe, Lancaster, PA 17501 • 717-658-2308 • Fax: 717-656-6756 • www.EurofinaUS.com/LanclabsEnv

Sample Description:

FR-APR-SB01-1 Soil

PFC Phase II

**AECOM** 

ELLE Sample #: SW 9618854

**ELLE Group #:** 

1945536

Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/19/2018 10:00 05/17/2018 15:05

SDG#:

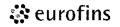
FSB08-06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous	EPA 537 mod QSM 5.1 table B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.31 J	0.19	0.57	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	0.85	0.19	0.65	0.77	1
14478	Perfluorohexanesulfonat	e 355-46-4	2.4	0.19	0.61	0.77	1
14478	Perfluorononanoic acid	375-95-1	0.71 J	0.19	0.65	0.77	1
14478	Perfluoro-octanesulfonat	e 1763-23-1	46	0.19	0.62	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.69 J	0.19	0.65	0.77	1
Wet Cl	hemistry	SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	.3.2	0.50	0.50	0.50 .	1
		oss in weight of the sample after us. The moisture result reported					

#### **Sample Comments**

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 03:52	Marissa C Drexinger	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1 .			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax: 717-656-6766 • www.EurofineUS.com/LancLabsEny

Sample Description:

FR-APR-SB01-5 Soil

PFC Phase II

**AECOM** 

ELLE Sample #:

SW 9618855 1945536

ELLE Group #: Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/19/2018 10:00 05/17/2018 15:40

SDG#:

FSB08-07

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous E	PA 537 mod QSM 5.1 able B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.40 J	0.19	0.57	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	0.22 J	0.19	0.65	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	2.7	0.19	0.61	0.77	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.65	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	6.4 <b>3</b> ,+	0.19	0.62	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.20 J	0.19	0.65	0.77	1
Wet Cl		M 2540 G-1997 Moisture Calc	%	%	%	%	
00111	Moisture	· n.a.	3.3	0.50	0.50	0.50	1
	Moisture represents the los	e in weight of the cample after	oven daring at				

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

#### **Sample Comments**

Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 04:07	Marissa C Drexinger	1		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1		

### Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-APR-SB01-5D Soil

**PFC Phase II** 

**AECOM** 

**ELLE Sample #: ELLE Group #:** 1945536

SW 9618856

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/19/2018 10:00 05/17/2018 15:40

SDG#:

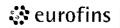
FSB08-08

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	0.61 J	0.19	0.58	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	0.34 J	0.19	0.66	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	5.2	0.19	0,62	0.77	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.66	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	12 5,+	0.19	0.63	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.38 J	0.19	0.66	0.77	1
Wet Ci	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	3.3 Jib	0.50	0.50	0.50	1
		iss in weight of the sample after s. The moisture result reported i					

#### **Sample Comments**

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 04:23	Marissa C Drexinger	1		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1		

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2A26 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6756 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-FRB-051718 Water

PFC Phase II

**AECOM** 

WW 9618857

ELLE Sample #: **ELLE Group #:** 

1945536

Matrix: Water

**Project Name:** 

Fresno Phase II

Submittal Date/Time:

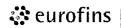
05/19/2018 10:00 05/17/2018 16:55 FSB08-09FB

Collection Date/Time: SDG#:

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/	MS Miscellaneous EPA 53/ table B		ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	1.0	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.27	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	1.0	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.54	2.1	2.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.27	1.1	1.8	1

### **Sample Comments**

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141012	05/30/2018 03:28	Joshua P Trost	1			
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141012	05/21/2018 09:30	Robert Brown	1			



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 747-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-APR-SB03-1 Soil

PFC Phase II

**AECOM** 

**ELLE Sample #: ELLE Group #:** 1945536

SW 9618859

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/19/2018 10:00 05/18/2018 11:15

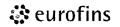
SDG#:

FSB08-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0,81	1
14478	Perfluorohexanesulfonate	355-46-4	N.D.	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	2.9	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.20	0.69	0.81	1
Wet Cl	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture .	n.a.	2.5	0.50	. 0.50	0.50	1
	Moisture represents the loss in 103 - 105 degrees Celsius. The as-received basis.			e e			

### **Sample Comments**

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 04:38	Marissa C Drexinger	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1				



### Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

**Sample Description:** 

FR-APR-SB03-5 Soil

PFC Phase II

ELLE Sample #:

**AECOM** 

SW 9618860

**ELLE Group #:** Matrix: Soil

1945536

Submittal Date/Time:

**Project Name:** 

05/19/2018 10:00 05/18/2018 11:20

Fresno Phase II

Collection Date/Time:

SDG#:

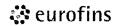
FSB08-12

CAT No.	Analysis Name	CAS Numbe	Dry r Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		1 ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0,21	0.62	0.83	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.21	0.71	0.83	1
14478	Perfluorohexanesulfonate	e 355-46-4	N.D.	0.21	0.67	0.83	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.71	0.83	1
14478	Perfluoro-octanesulfonate	e 1763-23-1	0.94	0.21	0.68	0.83	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.21	0.71	0.83	1
Wet Cl		SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	3.9	0.50 .	0.50	0.50	1
		oss in weight of the sample at	, , ,				

103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

### Sample Comments

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 04:54	Marissa C Drexinger	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1			



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax: 717-656-5766 • www.EurofinaUS.com/LancLabsEnv

**Sample Description:** 

FR-FTA-SB03-1 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623953

**ELLE Group #:** 

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/23/2018 10:05 05/21/2018 09:30

SDG#:

FSB10-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.60	0.80	1
14478	Perfluoroheptanoic acid	375-85-9	0.36 J	0.20	0.68	0.80	1
14478	Perfluorohexanesulfonate	355-46-4	1.0	0.20	0.64	0.80	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.68	0.80	1
14478	Perfluoro-octanesulfonate	1763-23-1	10	0.20	0.65	0.80	1
14478	Perfluorooctanoic acid	335-67-1	0.66 J	0.20	0.68	0.80	1
Wet C	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	4.2	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 12:39	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1			



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17801 \* 717-656-2300 \* Fax: 717-656-6766 \* www.EurofineUS.com/LanclabsEnv

Sample Description:

FR-FTA-SB03-5 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623954

**ELLE Group #:** 

1946800

Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 09:40

SDG#:

FSB10-02

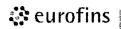
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	0.43 J	0.21	0.71	0.84	1
14478	Perfluorohexanesulfonat	e 355-46-4	1.2	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.71	0.84	1
14478	Perfluoro-octanesulfonat	e 1763-23-1	18	0.21	0.68	0.84	1
14478	Perfluorooctanoic acid	335-67-1	1.0	0.21	0.71	0,84	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	7.5	0.50	0,50	0.50	1
		loss in weight of the sample after us. The moisture result reported i					

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 12:55	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, Lanceater, PA 17601 • 717-656-2300 • Fax: 717-656-6765 • www.EurofineUS.com/LancLabsEnv

Sample Description:

FR-FTA-SB02-1 Soil

Fresno PFC Phase II

**AECOM** 

**ELLE Sample #:** SW 9623955

**ELLE Group #:** 

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/23/2018 10:05 05/21/2018 10:40

SDG#:

FSB10-03

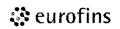
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous	EPA 537 mod QSM 5.1 table B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.58	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.65	0.77	1
14478	Perfluorohexanesulfonat	e 355-46-4	1.9	0.19	0.61	0.77	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.65	0.77	1
14478	Perfluoro-octanesulfonat	e 1763-23-1	3.1	0.19	0.62	0.77	1
14478	Perfluorooctanoic acid	335-67-1	1.6	0.19	0.65	0.77	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc			%	%	%	%	øv.
00111	Moisture	n.a.	3.5	0.50	0.50	0.50	1
		loss in weight of the sample after us. The moisture result reported i					

### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 13:10	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax: 717-656-5766 • www.EurolineUS.com/LancLabsEnv

Sample Description:

FR-FTA-SB02-5 Soil

Fresno PFC Phase II

**AECOM** 

SW 9623956

**ELLE Group #:** 

ELLE Sample #:

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 10:50

SDG#:

FSB10-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonat	e 375-73-5	N.D.	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	0.69 J	0.21	0.71	0.84	1
14478	Perfluorohexanesulfonat	e 355-46-4	9.5	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.71	0.84	1
14478	Perfluoro-octanesulfonal	te 1763-23-1	N.D.	0.21	0.68	0.84	1
14478	Perfluorooctanoic acid	335-67-1	17	0.21	0.71	0.84	1
Wet Ci	nemistry	SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	5.4	0.50	0,50	0.50	1
		loss in weight of the sample afte us. The moisture result reported					

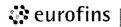
as-received basis.

### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 13:26	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-FTA-SB02-5D Soil

Fresno PFC Phase II

**AECOM** 

SW 9623957

**ELLE Sample #: ELLE Group #:** 

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 10:50 FSB10-05FD

SDG#:

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.62	0.83	1
14478	Perfluoroheptanoic acid	375-85-9	0.88	0.21	0.71	0.83	1
14478	Perfluorohexanesulfonate	355-46-4	12	0.21	0.67	0.83	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.71	0.83	1
14478	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.21	0.68	0.83	1
14478	Perfluorooctanoic acid	335-67-1	17	0.21	0.71	0.83	1
Wet C		6M 2540 G-1997 6Moisture Calc	%	%	%	%	•
00111	Moisture	n.a.	5.7	0.50	0.50	0.50	1
		ss in weight of the sample after				*	

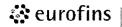
103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

### Sample Comments

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 13:41	Joshua, P Trost	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

**Sample Description:** 

FR-FTA-SB01-1 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #:

SW 9623958

1946800

**ELLE Group #:** Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/23/2018 10:05 05/21/2018 11:53

SDG#:

FSB10-06

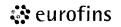
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 m table B-15			ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.40 J	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	0.39 J	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	1.5	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	0.30 J	0.20	0.64	0.79	1
14478	Perfluorooctanoic acid	335-67-1	0.28 J	0.20	0.67	0.79	1
		SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	4.3 ブリ	0.50	0.50	0.50	1
		oss in weight of the sample after s. The moisture result reported i					

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 13:57	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

**Sample Description:** 

FR-FTA-SB01-5 Soil

Fresno PFC Phase II

**AECOM** 

**ELLE Sample #: SW 9623959** 

ELLE Group #: Matrix: Soil 1946800

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 12:03

SDG#:

FSB10-07

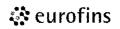
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	0.44 J	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	2.4	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	5.3	0.20	0.64	0.79	1
14478	Perfluorooctanoic acid	335-67-1	2.1	0.20	0.67	0.79	1
Wet Ci	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	4.9	0.50	0.50	0.50	1
	Moisture represents the loss in 103 - 105 degrees Celsius. The as-received basis.						• .

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 14:43	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 . 717-655-2300 . Fax: 717-556-6756 . www.EurofinsUS.com/LancLabs@nv

Sample Description:

FR-100-SB01-1 Soil

Fresno PFC Phase II

ELLE Sample #: ELLE Group #:

Matrix: Soil

**AECOM** 

SW 9623960

1946800

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 14:10

SDG#:

FSB10-08

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.60	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	1.5	0,20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	1.8	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	0.77 J	0,20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	140	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	5.2	0.20	0.69	0.81	1
Wet CI	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	7.3	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 14:59	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1			

### Analysis Report

2426 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-100-SB01-5 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623961

1946800

ELLE Group #: Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 14:20

SDG#:

FSB10-09

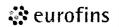
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonat	e 375-73-5	N.D.	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	0.50 J	0.21	0.70	0.82	1
14478	Perfluorohexanesulfona	e 355-46-4	1.3	0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.70	0.82	1
14478	Perfluoro-octanesulfona	te 1763-23-1	110	0.21	0.67	0.82	1
14478	Perfluorooctanoic acid	335-67-1	1.0	0.21	0.70	0.82	1
Wet CI	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture ·	n.a.	6.6	0.50	0.50	0.50	1
		loss in weight of the sample afte us. The moisture result reported			-		

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 15:14	Joshua P Trost	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17801 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinaUS.com/LanclabsEnv

Sample Description:

FR-104-SB02-1 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623962

ELLE Group #:

1946800

Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 14:40

SDG#:

FSB10-10

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	0.33 J	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	6.5	0.20	0,69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	38	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	3.7	0.20	0,69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	570	2.0	6.6	8.1	10
14478	Perfluorooctanoic acid	335-67-1	49	0.20	0.69	0.81	1
Wet Cl		540 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a. ·	7.6	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record											
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor					
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 15:30	Joshua P Trost	1					
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/06/2018 10:04	Joshua P Trost	10					
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1					
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1					

<sup>\*=</sup>This limit was used in the evaluation of the final result

### Analysis Report

2426 New Holland Pike, Lanceater, PA 17601 . 717-656-2300 . Fax: 717-656-5766 . www.EurofinsUS.com/LancLabsEny

Sample Description:

FR-104-SB02-5 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623963

**ELLE Group #:** 

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/23/2018 10:05 05/21/2018 14:58

SDG#:

FSB10-11

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF	
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g			
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.62	0.82	1	
14478	Perfluoroheptanoic acid	375-85-9	1.7	0.21	0.70	0.82	1	
14478	Perfluorohexanesulfonat	e 355-46-4	8.6	0.21	0.66	0.82	1	
14478	Perfluorononanoic acid	375-95-1	1.1	0.21	0.70	0.82	1	
14478	Perfluoro-octanesulfonat	e 1763-23-1	250	2.1	6.7	8.2	10	
14478	Perfluorooctanoic acid	335-67-1	16	0.21	0.70	0.82	1	
Wet CI		SM 2540 G-1997 %Moisture Calc	%	%	%	%		
00111	Moisture	n.a.	8.1	0.50	0.50	0.50	1	
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an							

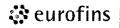
as-received basis.

### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record											
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor					
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 15:45	Joshua P Trost	1					
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/06/2018 10:20	Joshua P Trost	10					
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1					
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1					

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LanclabsEnv

Sample Description:

FR-104-SB01-1 Soil

Fresno PFC Phase II

**AECOM** 

SW 9623964

**ELLE Group #:** 

ELLE Sample #:

1946800

Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 15:10

SDG#:

FSB10-12

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	0.66 J	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	8.6	0.21	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	16	0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	8.1	0.21	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	170	2.1	6.7	8.2	10
14478	Perfluorooctanoic acid	335-67-1	51	0.21	0.70	0.82	1
Wet Ch		SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	3.0	. 0.50	0.50	0.50	1 .

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 16:01	Joshua P Trost	1				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/07/2018 15:49	Joshua P Trost	10				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1				

### Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-104-SB01-5 Soil

Fresno PFC Phase II

**AECOM** 

SW 9623965

ELLE Group #:

1946800

Matrix: Soil

ELLE Sample #:

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 15:20

SDG#:

FSB10-13

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
NO.			Result				
LC/MS	/MS Miscellaneous El	PA 537 mod QSM 5.1	ng/g	ng/g	ng/g	ng/g	
	ta	ble B-15					
14478	Perfluorobutanesulfonate	375-73-5	1.3	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	13	0.21	0.71	0.84	1
14478	Perfluorohexanesulfonate	355-46-4	58	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	8.5	0.21	0.71	0.84	1
14478	Perfluoro-octanesulfonate	1763-23-1	2,000	21	68	84	100
14478	Perfluorooctanoic acid	335-67-1	43	0.21	0.71	0.84	. 1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	7.9	0.50	0.50	0.50	1.
,		in weight of the sample after The moisture result reported		*•		· · · · · · · · · · · · · · · · · · ·	<b>.</b>

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record											
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor					
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 16:16	Joshua P Trost	1					
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/06/2018 10:35	Joshua P Trost	100					
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1					
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1					

<sup>\*=</sup>This limit was used in the evaluation of the final result

# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 \* 717-656-2300 \* Fax: 717-656-6766 \* www.Eurofinat/S.com/LanclabsEnv

Sample Description:

FR-145-SB02-1 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623966

ELLE Group #: Matrix: Soil 1946800

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 16:00

SDG#:

FSB10-14

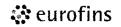
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.58	0.78	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.66	0.78	1
14478	Perfluorohexanesulfonate	355-46-4	0.85	0.19	0.62	0.78	1
14478	Perfluorononanoic acid	375-95-1	0.21 J	0.19	0.66	0.78	1
14478	Perfluoro-octanesulfonate	1763-23-1	17	0.19	0.63	0.78	1
14478	Perfluorooctanoic acid	335-67-1	0.26 J	0.19	0.66	0.78	1
Wet CI		M 2540 G-1997 Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	6.4	0.50	0.50	0.50	1
,		ss in weight of the sample after The moisture result reported i		~.			٠ .

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 16:32	Joshua P Trost	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2426 New Holland Pike, Lancazter, PA 17601 • 747-656-2300 • Fax: 717-656-6765 • www.EurofineUS.com/LanclabsEny

Sample Description:

FR-145-SB02-5 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623967

**ELLE Group #:** 

1946800

Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/21/2018 16:15

SDG#:

FSB10-15

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.21	0.72	0.84	1
14478	Perfluorohexanesulfonat	e 355-46-4	0.24 J	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0,21	0.72	0.84	1
14478	Perfluoro-octanesulfonat	e 1763-23-1	1.6 7,4	0.21	0.68	0.84	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.21	0.72	0.84	1
Wet Ci	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	<b>%</b>	
00111	Moisture	n.a.	6.9	0.50	0.50	0.50	1
		oss in weight of the sample afte us. The moisture result reported					

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 16:47	Joshua P Trost	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result

### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-666-6765 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-100-SB01-5D Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623968

**ELLE Group #:** 

1946800

Matrix: Soil

Project Name:
Submittal Date/Time:

Fresno Phase II

Collection Date/Time:

05/23/2018 10:05 05/21/2018 14:20 FSB10-16FD

SDG#:

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA table	537 mod QSM 5.1 B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	1.1	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	3.5	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	0.36 J	0,20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	340 J,F	2.0	6.4	7.9	10
14478	Perfluorooctanoic acid	335-67-1	3.0	0.20	0.67	0.79	1
Wet Ci		540 G-1997 isture Calc	%	%	%	~% °	
00111	Moisture	n.a.	7.7	0.50	0.50	0.50	1

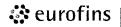
Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record											
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor					
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 17:03	Joshua P Trost	1					
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/06/2018 10:51	Joshua P Trost	10					
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1					
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1-	18144820006B	05/24/2018 13:17	Larry E Bevins	1					

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 . 717-656-2300 . Fax: 717-656-6766 . www.EurofinaUS.com/LanclabsEnv

Sample Description:

FR-APR-SB04-1 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623971

ELLE Group #:

1946800

Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 08:56 FSB10-19BKG

Collection SDG#:

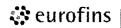
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	0.42 J	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	4.7 57 M	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	1.2	0.20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	70	0.20	0.64	0.79	1
14478	Perfluorooctanoic acid	335-67-1	4.7 J, M	0.20	0.67	0.79	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	1.8	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.				·	•	•

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 02:56	Joshua P Trost	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015 -	05/24/2018 17:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 - 717-658-2300 - Fex: 717-666-6768 - www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-APR-SB02-1 Soil

Fresno PFC Phase II

**AECOM** 

**ELLE Sample #:** SW 9623969

**ELLE Group #:** Matrix: Soil

1946800

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/23/2018 10:05 05/22/2018 07:47

SDG#:

FSB10-17

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	e 375-73-5	N.D.	0.19	0.58	0.78	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.66	0.78	1
14478	Perfluorohexanesulfonat	e 355-46-4	0.26 J	0.19	0.62	0.78	. 1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.66	0.78	1
14478	Perfluoro-octanesulfonat	e 1763-23-1	3.5	0.19	0.63	0.78	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.19	0.66	0.78	1
Wet CI	nemistry	SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	2.3	0.50	0.50	0.50	1
		loss in weight of the sample afte us. The moisture result reported					

as-received basis.

### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 02:25	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result

### Analysis Report

2425 New Holland Pike, Lancaster, PA 17801 + 717-656-2300 + Fax: 717-656-5755 + www.EurofinsUS.com/LanclabsEnv

Sample Description:

FR-APR-SB02-5 Soil

Fresno PFC Phase II

**AECOM** 

**ELLE Sample #:** SW 9623970

**ELLE Group #:** Matrix: Soil

1946800

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/23/2018 10:05 05/22/2018 07:58

SDG#:

FSB10-18

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.22	0.66	0.88	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.22	0.75	0.88	1
14478	Perfluorohexanesulfonat	e 355-46-4	N.D.	0.22	0.71	0.88	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.22	0.75	0.88	1
14478	Perfluoro-octanesulfonat	e 1763-23-1	1.9	0.22	0.72	0.88	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.22	0.75	0.88	1
Wet Ch	nemistry	SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	10.4	0.50	0.50	0.50	1
•		loss in weight of the sample after us. The moisture result reported i		•			

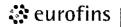
as-received basis.

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 02:40	Joshua P Trost	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2426 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax; 717-656-5766 • www.EurofinaUS.com/LancLabsEnv

Sample Description:

FR-APR-SB04-5 Soil

Fresno PFC Phase II

**AECOM** 

SW 9623974

**ELLE Group #:** 

ELLE Sample #:

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 09:04

SDG#:

FSB10-20

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.21	0.71	0.84	1
14478	Perfluorohexanesulfonate	355-46-4	0.23 J	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	0.29 J	0.21	0.71	0.84	1
14478	Perfluoro-octanesulfonate	1763-23-1	9.7	0.21	0.68	0.84	1
14478	Perfluorooctanoic acid	335-67-1	0.30 J	0.21	0.71	0.84	1
Wet Cl		540 G-1997 isture Calc	%	<b>%</b>	% .	%	
00111	Moisture	n.a.	8.8	0.50	0.50	0.50	1
	Moisture represents the loss in v	•	, ,				

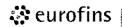
as-received basis.

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 03:11	Joshua P Trost	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 • 717-556-2300 • Fax: 717-656-5765 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-APR-SB05-1 Soil

Fresno PFC Phase II

AECOM ELLE Sample #:

SW 9623975

**ELLE Group #:** 

1946800

Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 09:40

SDG#:

FSB10-21

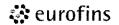
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	0,60 J	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	2.5	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	0.34 J	0.20	0.69	0.81	. 1
Wet CI		540 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	2.7	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						•

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 03:27	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820005 <b>A</b>	05/24/2018 09:13	William C Schwebel	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofineUS.com/LanclabsEnv

Sample Description:

FR-APR-SB05-5 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623976

**ELLE Group #:** 

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 11:00

SDG#:

FSB10-22

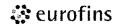
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.64	0.85	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.21	0.72	0.85	1
14478	Perfluorohexanesulfonate	355-46-4	0.29 J	0.21	0.68	0.85	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.72	0.85	1
14478	Perfluoro-octanesulfonate	1763-23-1	1.7	0,21	0.69	0.85	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.21	0.72	0.85	. 1
Net Cl	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	5.9	0.50	0.50	0.50	. 1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 03:42	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820005A	05/24/2018 09:13	William C Schwebel	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 + 717-656-2300 • Fax: 717-656-6765 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-157-SB02-1 Soil

Fresno PFC Phase II

**AECOM** 

SW 9623977

ELLE Sample #: ELLE Group #:

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 11:12

SDG#:

FSB10-23

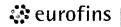
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.57	0.76	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.65	0.76	1
14478	Perfluorohexanesulfonate	355-46-4	0.35 J	0.19	0.61	0.76	1
14478	Perfluorononanoic acid	375-95-1	1.4	0.19	0.65	0.76	1
14478	Perfluoro-octanesulfonate	1763-23-1	29	0.19	0.62	0.76	1
14478	Perfluorooctanoic acid	335-67-1	0.26 J	0.19	0.65	0.76	1
Wet Cl		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	3.1	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 04:44	Joshua P Trost	1		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820005A	05/24/2018 09:13	William C Schwebel	1		

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 \* 717-656-2300 \* Fax: 717-656-6766 \* www.EurofinaUS.com/LancLabsEnv

Sample Description:

FR-157-SB02-1D Soil

Fresno PFC Phase II

**AECOM** 

**ELLE Sample #:** SW 9623978

**ELLE Group #:** 

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 11:12 FSB10-24FD

SDG#:

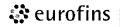
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous E ta	PA 537 mod QSM 5.1 ble B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	Ň.D.	0.19	0.58	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.66	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	1.1	0.19	0.62	0.77	1
14478	Perfluorononanoic acid	375-95-1	0.86	0.19	0.66	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	13 7	0.19	0.63	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.54 J	0.19	0.66	0.77	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	3.1	0.50	0.50	0.50	1
		s in weight of the sample after The moisture result reported i				•	

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 05:00	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820005A	05/24/2018 09:13	William C Schwebel	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax: 717-656-6765 • www.EurofinaUS.com/LancLabsEnv

Sample Description: FR-157-SB03-1 Soil

Fresno PFC Phase II

ELLE Sample #:

SW 9623981

**ELLE Group #:** 

1946801

Matrix: Soil

**AECOM** 

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 12:18

SDG#:

FSB11-01

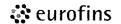
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	0.30 J	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	1.5	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.20	0.69	0.81	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a	2.7	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.					-	

### Sample Comments

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 05:47	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820007A	05/24/2018 13:40	Larry E Bevins	1			

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17501 • 717-656-2300 • Fax: 717-656-6766 • www.EurofineUS.com/LancLabsEnv

**Sample Description:** 

FR-157-SB03-5 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623982

**ELLE Group #:** 

1946801

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 12:25

SDG#:

FSB11-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonat	e 375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	0.29 J	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonat	e 355-46-4	1.6	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	1.6	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfona	te 1763-23-1	44	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	0.33 J	0.20	0.69	0.81	1
Wet Ch	nemistry	SM 2540 G-1997 %Moisture Calc	%	%	% .	%	
00111	Moisture	n.a.	2.8	0.50	0.50	- 0.50	1
	•	loss in weight of the sample aft					

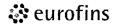
-received basis.

as-received basis.

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 06:02	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820007A	05/24/2018 13:40	Larry E Bevins	1			



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-FRB-052218 Water

Fresno PFC Phase II

**ELLE Sample #:** 

**AECOM** 

WW 9623983

DF

1946801

**ELLE Group #:** 

Matrix: Water

Limit of

ng/l

Quantitation

**Project Name:** 

14434

14434

14434

14434

14434

14434

Fresno Phase II

05/23/2018 10:05 05/22/2018 14:25

Submittal Date/Time: Collection Date/Time:

SDG#:	F	SB11-03FB 		
CAT No.	Analysis Name	CAS Number	Result	Detection Limit*
LC/MS	/MS Miscellaneous	EPA 537 mod QSM 5.1 table B-15	ng/l	ng/l

375-73-5

375-85-9

355-46-4

375-95-1

1763-23-1

335-67-1

#### N.D. 0.27 0.99 N.D. 0.27 1.1 1.8 N.D. 0.36 0.99 1.8 N.D. 0.36 1.1 1.8 N.D. 0.54 2.1 2.7 N.D. 0.27 1.1 1.8

Limit of

ng/l

Detection

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

Perfluorobutanesulfonate

Perfluorohexanesulfonate

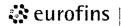
Perfluoro-octanesulfonate

Perfluoroheptanoic acid

Perfluorononanoic acid

Perfluorooctanoic acid

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Tria!#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144010	06/03/2018 01:07	Joshua P Trost	1		
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144010	05/24/2018 09:10	Courtney J Fatta	1		



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 \* 717-656-2300 \* Fax: 717-656-6766 \* www.EurofinsUS.com/LanclabsEnv

Sample Description:

FR-157-SB01-5 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623980

ELLE Group #: Matrix: Soil 1946800

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 11:54

SDG#:

FSB10-26

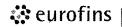
CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous	EPA 537 mod QSM 5.1 table B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonat	e 375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonat	e 355-46-4	N.D.	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonat	te 1763-23-1	4.1	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.20	0.69	0.81	1
Wet Cl	nemistry	SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	4.8	0.50	0.50	0.50	1
		loss in weight of the sample after us. The moisture result reported i				•	

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 05:31	Joshua P Trost	1		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820005A	05/24/2018 09:13	William C Schwebel	1		

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Pax: 717-656-6756 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-157-SB01-1 Soil

Fresno PFC Phase II

**AECOM** 

**ELLE Sample #:** SW 9623979

**ELLE Group #:** 

1946800

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 05/23/2018 10:05 05/22/2018 11:47

SDG#:

FSB10-25

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS		PA 537 mod QSM 5.1 ble B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	0.27 J	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	2.2	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.20	0.69	0.81	1
Wet Cl		M 2540 G-1997 Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	2.8	0.50	0.50	0.50	1
		s in weight of the sample afte The moisture result reported					

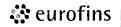
as-received basis.

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 05:16	Joshua P Trost	1		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820005A	05/24/2018 09:13	William C Schwebel	1		

<sup>\*=</sup>This limit was used in the evaluation of the final result



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 \* 717-656-2300 \* Fex: 717-656-6766 \* www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-157-SB02-5 Soil

Fresno PFC Phase II

**AECOM** 

ELLE Sample #: SW 9623984

ELLE Group #:

1946801

Matrix: Soil

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

05/23/2018 10:05 05/22/2018 11:25

SDG#:

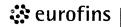
FSB11-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table	· · · · · · · · · · · · · · · · · · ·	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.58	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.66	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	0.43 J	0.19	0.62	0.77	1
14478	Perfluorononanoic acid	375-95-1	0.53 J	0.19	0.66	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	46	0.19	0.63	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.23 J	0.19	0.66	0.77	1
Wet CI		540 G-1997 sture Calc	%	%	%	%	
00111	Moisture ,	n.a.	5.9	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 06:18	Joshua P Trost	1		
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1		
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820007A	05/24/2018 13:40	Larry E Bevins	1		



### Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6768 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-EB-Rope-062618 Water

Fresno ANG PFC SI

**AECOM** 

**ELLE Sample #:** WW 9686219

**ELLE Group #:** 

1961420

Matrix: Water

**Project Name:** 

SDG#:

Fresno Phase II

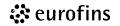
Submittal Date/Time: Collection Date/Time: 06/30/2018 10:10 06/26/2018 11:10 FSB26-01EB

CAT No.	Analysis Name /MS Miscellaneous EPA 537 m	CAS Number	Result ng/l	Detection Limit* ng/l	Limit of Detection ng/l	Limit of Quantitation ng/l	DF
LC/IVI3	table B-15	oa QSIVI 5. I	ng/i	ngn	ng/r	ng/i	
14434	Perfluorobutanesulfonate	375-73-5	3.9 U, Ux	0.30	4.7 3.9	2.0 3.9	1
14434	Perfluoroheptanoic acid	375-85-9	1.5 / U, Ux	0.30	4.2 1,5	2.0	1
14434	Perfluorohexanesulfonate	355-46-4	9.5 VIVE	0.40	<del>1.1</del> -9.5	<del>2.0</del> 9.5	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	6.8 U.Ux	0.60	<sub>2.3</sub> 6.8	<del>3.0</del> 6.8	1
14434	Perfluorooctanoic acid	335-67-1	2.3 U,UX	0.30	<del>1.2</del> 2.3	<del>2.0</del> 2.3	1

**Sample Comments** 

7/35/18

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 19:05	Joshua P Trost	1			
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1			



### Analysis Report

Limit of

Quantitation

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-EB-Pump-062618 Water

Fresno ANG PFC SI

**AECOM** 

WW 9686220

DF

ELLE Sample #: ELLE Group #:

1961420

Matrix: Water

Project Name:

Fresno Phase II

Submittal Date/Time:

06/30/2018 10:10 06/26/2018 11:15

CAT No.	Analysis Name		CAS Numbe
Collecti SDG#:	on Date/Time:	06/26/2018 11 FSB26-02EB	:15

ng/i LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 ng/l ng/l table B-15 4.2 U, UX ح.944,ك 4.74.2 14434 Perfluorobutanesulfonate 375-73-5 0.26 <del>1.0</del> 1.8 1.8 U, UX 14434 Perfluoroheptanoic acid 375-85-9 0.26 0.94 4.9 4.7 9.9 9.9 U, UX 14434 Perfluorohexanesulfonate 355-46-4 0.34 14434 Perfluorononanoic acid 375-95-1 N.D. 0.34 <del>2.0</del> 8.3 2.6 8°.3 8.3 U, Ux 14434 Perfluoro-octanesulfonate 1763-23-1 0.51 2.8 UIUX <del>1.0</del> 2.8 1.72.8 14434 Perfluorooctanoic acid 335-67-1 0.26

Result

Detection

Limit\*

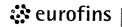
**Sample Comments** 

ZN 7/25/18

Limit of

Detection

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 19:21	Joshua P Trost	1		
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1		



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-EB-Sounder-062618 Water

Fresno ANG PFC SI

**AECOM** 

ELLE Sample #: WW 9686221

**ELLE Group #:** 

1961420

Matrix: Water

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time: 06/30/2018 10:10

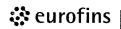
06/26/2018 11:20 SDG#: FSB26-03EB

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS		EPA 537 mod QSM 5.1 table B-15	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate		4.0 U, UX	0.27	- <del>0.98</del> 4.0	<del>1.8</del> 4.0	1
14434	Perfluoroheptanoic acid	375-85-9	1.7 8 V, UX	0.27	4.t 1.フ	1.8	1
14434	Perfluorohexanesulfonate	e 355-46-4	9.4 U, Ux	0.36	<del>0.98</del> 9.4	<del>1.8</del> 9.4	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate		7.5 U, Ux	0.53	<del>2.0</del> 7 5	<del>2.7</del> 7.5	1
14434	Perfluorooctanoic acid	335-67-1	2.1 U1 UX	0.27	ا، ههه	4.8 2.1	1

**Sample Comments** 

7/25/18 2N

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 19:36	Joshua P Trost	1		
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1		



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-EB-Tube-062618 Water

Fresno ANG PFC SI

**AECOM** 

WW 9686222

ELLE Sample #: **ELLE Group #:** 

1961420

Matrix: Water

**Project Name:** 

Fresno Phase II

06/30/2018 10:10 06/26/2018 11:25 FSB26-04EB

Submittal Date/Time: Collection Date/Time: SDG#:

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 537 m	od QSM 5.1	ng/i	ng/l	ng/l	ng/l	
	table B-15				4	110	
14434	Perfluorobutanesulfonate	375-73-5	$4.0 \ U_i U_X$	0.27	- <del>0.97</del> 4,0	1.8 4.0	1
14434	Perfluoroheptanoic acid	375-85-9	1.5 8 U,UX	0.27	4.4 <del>- 1</del> .5	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	9.3 U, UX	0.35	-0.97 a.3	4.8 4.3	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	7.4 U, UX	0.53	20 7.4	2.7 7·4	1
14434	Perfluorooctanoic acid	335-67-1	2.0 U, Ux	0.27	1.T a.0	1.8 2.0	1

**Sample Comments** 

7/25/18

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 20:07	Joshua P Trost	1		
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1		



# Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-5768 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-145-MW01D Water

Fresno ANG PFC SI

**AECOM** 

ELLE Sample #: WW 9686223

ELLE Group #: Matrix: Water 1961420

**Project Name:** 

SDG#:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

06/30/2018 10:10 06/26/2018 11:20 FSB26-05FD

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table i	•	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	3,400	25	93	170	100
14434	Perfluoroheptanoic acid	375-85-9	300	2.5	10	17	10
14434	Perfluorohexanesulfonate	355-46-4	1,300	3.4	9.3	17	10
14434	Perfluorononanoic acid	375-95-1	N.D.	3.4	10	17	10
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	5.1	20	25	10
14434	Perfluorooctanoic acid	335-67-1	11 XU,UX	2.5	40° 11	17	10
Repo	orting limits were raised due to interfe	erence from the sample	•		ZN 7/2	5/18	

### **Sample Comments**

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 13:26	Marissa C Drexinger	10			
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 13:42	Marissa C Drexinger	100			
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1			



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-145-MW01 Water

Fresno ANG PFC SI

AECOM ELLE Sample #:

WW 9686224

1961420

Project Name:

Fresno Phase II

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ELLE Group #: Matrix: Water

Submittal Date/Time: Collection Date/Time:

06/30/2018 10:10 06/26/2018 11:20

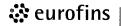
SDG#:

FSB26-06

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 53 table B	•	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	4,500	30	110	200	100
14434	Perfluoroheptanoic acid	375-85-9	370	3.0	12	20	10
14434	Perfluorohexanesulfonate	355-46-4	1,600	4.0	11	20	10
14434	Perfluorononanoic acid	375-95-1	N.D.	4.0	12	20	10
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	6.0	23	30	10
14434	Perfluorooctanoic acid	335-67-1	13 80,0x	3.0	12 13	20	10
Reporting limits were raised due to interference from the sample matrix.							

### **Sample Comments**

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 13:57	Marissa C Drexinger	10		
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 14:13	Marissa C Drexinger	100		
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1		



Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6768 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-MWBP-09C Water

Fresno ANG PFC SI

ELLE Sample #:

WW 9686225

ELLE Group #: 1961420

Matrix: Water

**AECOM** 

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

06/30/2018 10:10 06/27/2018 09:09

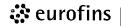
SDG#:

FSB26-07

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	MS Miscellaneous EPA/ table	<del>-</del>	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	8.2 U, Ux	0.28	1.0 8.2	1.9 8.2	1
14434	Perfluoroheptanoic acid	375-85-9	6.4 U, Ux	0.28	<del>1.1</del> 6.4	<del>1.9</del> 6.4	1
14434	Perfluorohexanesulfonate	355-46-4	25 U, U x	0.37	4 <del>.0</del> 25	<del>1.9</del> 25	1
14434	Perfluorononanoic acid	375-95-1	1.4 J	0.37	1.1	1.9	1
14434	Perfluoro-octanesulfonate	1763-23-1	58	0.56	2.1	2.8	1
14434	Perfluorooctanoic acid	335-67-1	14 -	0.28	1.1	1.9	1

#### **Sample Comments**

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 20:54	Joshua P Trost	1			
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1			



Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-HFMW-46B Water

Fresno ANG PFC SI

AECOM ELLE Sample #:

WW 9686226

ELLE Group #: Matrix: Water

1961420

**Project Name:** 

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

06/30/2018 10:10 06/27/2018 12:00

SDG#:

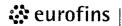
FSB26-08

CA <sup>-</sup> No.		CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/	MS/MS Miscellaneous EPA 537/ table B-		ng/l	ng/l	ng/l	ng/l	
144	134 Perfluorobutanesulfonate	375-73-5	7.3 U, UX	0.30	4.4 7.3	20 7.3	1
144	34 Perfluoroheptanoic acid	375-85-9	1.8 80, 0x	0.30	4-2 1.8	2.0	1
144	34 Perfluorohexanesulfonate	355-46-4	6.7 U1 UX	0.40	<del>4.4</del> 6.7	2.0 6.7	1
144	34 Perfluorononanoic acid	375-95-1	N.D.	0.40	1.2	2.0	1
144	34 Perfluoro-octanesulfonate	1763-23-1	26 U, Ux	0.60	<del>2.8</del> 26	3.0 26	1
144	Perfluorooctanoic acid	335-67-1	2.3 U1 Ux	0.30	<del>4.2-</del> 2.3	<del>2.0</del> 2.3	1

**Sample Comments** 

ZN 7/25/18

	Laboratory Sample Analysis Record								
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor		
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 21:10	Joshua P Trost	1		
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1		



# Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinaUS.com/LanclabsEny

**Sample Description:** 

FR-FTA-MW01 Water

Fresno ANG PFC SI

**AECOM** 

**ELLE Sample #:** WW 9686227

**ELLE Group #:** 

1961420

Submittal Date/Time:

**Project Name:** 

06/30/2018 10:10 06/29/2018 08:20

Fresno Phase II

Matrix: Water

Collection Date/Time:

SDG#: FSB26-09BKG

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	MS Miscellaneous EPA 5/ table	•	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	120	0.30	1,1	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	590	3.0	12	20	10
14434	Perfluorohexanesulfonate	355-46-4	1,300	4.0	11	20	10
14434	Perfluorononanoic acid	375-95-1	0.75 J	0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	10 U, Ux	0.60	- <del>23</del> 10	<del>3.0</del> 10	1
14434	Perfluorooctanoic acid	335-67-1	170	0.30	1.2	2.0	1

**Sample Comments** 

7/25/18

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 21:25	Joshua P Trost	1				
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 14:28	Marissa C Drexinger	10				
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1				



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

**Sample Description:** 

FR-100-MW01 Water

Fresno ANG PFC SI

**AECOM** 

ELLE Sample #: WW 9686230

ELLE Group #: Matrix: Water 1961420

Fresno Phase II

Submittal Date/Time:

**Project Name:** 

06/30/2018 10:10

Collection Date/Time:

06/29/2018 10:18

SDG#:

FSB26-10

CAT No.	Analysis Name /MS Miscellaneous EPA 537 n	CAS Number	Result ng/l	Detection Limit* ng/l	Limit of Detection ng/l	Limit of Quantitation ng/l	DF
	table B-15	•					
14434	Perfluorobutanesulfonate	375-73-5	1.6 80,0x	0.30	4.4 1.6	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	3.4 U, U X	0.30	<del>1.2</del> 3.4	<del>-2.0</del> 3.4	1
14434	Perfluorohexanesulfonate	355-46-4	75	0.40	1.1	2.0	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	8.4 U, Ux	0.60	<del>23</del> 8.4	<del>3.0-</del> 8.4	1
14434	Perfluorooctanoic acid	335-67-1	130	0.30	1.2	2.0	1

**Sample Comments** 

ZN 7/25/18

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 22:12	Joshua P Trost	1				
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1				



# Analysis Report

2425 New Holland Pike, Lancester, PA 17601 + 717-656-2390 + Pax: 717-656-6766 + www.EurofinsUS.com/LancLabsEnv

Sample Description:

FR-FRB-1-062918 Water

Fresno ANG PFC SI

**AECOM** 

**ELLE Sample #:** 

WW 9686231 1961420

**ELLE Group #:** Matrix: Water

**Project Name:** 

Fresno Phase II

Submittal Date/Time:

06/30/2018 10:10 06/29/2018 10:30

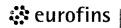
Collection Date/Time:

SDG#: FSB26-11FB

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/	MS Miscellaneous EPA 537 m table B-15	od QSM 5.1	ng/l	ng/l	ng/i	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.97	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.27	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.97	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.53	2.0	2.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.27	1.1	1.8	1

### **Sample Comments**

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 22:27	Joshua P Trost	1			
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1			



Analysis Report

2425 New Holland Pika, Lancaster, PA 17601 + 717-656-2300 + Fax: 717-656-6766 + www.EurofinsUS.com/LanclabsEnv

Sample Description:

FR-OF4-SD01 Soil

Fresno ANG PFC SI

ELLE Sample #: ELLE Group #:

SW 9686232

1961420

ELLE Group Matrix: Soil

**AECOM** 

Project Name:

Fresno Phase II

Submittal Date/Time: Collection Date/Time:

06/30/2018 10:10 06/29/2018 11:26

SDG#:

FSB26-12

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	0.45 J	0.19	0.57	0.76	1
14478	Perfluoroheptanoic acid	375-85-9	0.57 J	0.19	0.65	0.76	1
14478	Perfluorohexanesulfonate	355-46-4	1.3	0.19	0.61	0.76	1
14478	Perfluorononanoic acid	375-95-1	1.0	0.19	0.65	0.76	1
14478	Perfluoro-octanesulfonate	1763-23-1	16	0.19	0.62	0.76	1
14478	Perfluorooctanoic acid	335-67-1	0.71 J	0.19	0.65	0.76	1
Wet Ci		640 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	4.3	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

#### **Sample Comments**

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18191003	07/12/2018 02:20	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	2	18191003	07/10/2018 09:10	Courtney J Fatta	. <b>1</b>			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18184820002B	07/03/2018 09:52	William C Schwebel	1			



# Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofineUS.com/LancLabsEnv

**Sample Description:** 

FR-OF4-SD01D Soil

Fresno ANG PFC SI

**ELLE Sample #:** ELLE Group #:

Matrix: Soil

**AECOM** 

SW 9686233

1961420

**Project Name:** 

Fresno Phase II

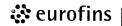
Submittal Date/Time: Collection Date/Time: 06/30/2018 10:10 06/29/2018 11:26 FSB26-13FD

SDG#:

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.63 J	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	0.75 J	0.21	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	1.2	0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	2.1	0.21	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	18	0.21	0.67	0.82	1
14478	Perfluorooctanoic acid	335-67-1	0.92	0.21	0.70	0.82	1
Wet Cl		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	4.4	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

#### **Sample Comments**

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18191003	07/12/2018 02:36	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	2	18191003	07/10/2018 09:10	Courtney J Fatta	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18184820002B	07/03/2018 09:52	William C Schwebel	1			



# Analysis Report

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Sample Description:

FR-OF1-SD01 Soil

Fresno ANG PFC SI

**AECOM** 

**ELLE Sample #:** SW 9686234

**ELLE Group #:** 

1961420

Matrix: Soil

**Project Name:** 

Fresno Phase II

Submittal Date/Time:

06/30/2018 10:10 06/29/2018 11:48 FSB26-14BKG

Collection Date/Time: SDG#:

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.57	0.76	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.65	0.76	1
14478	Perfluorohexanesulfonate	355-46-4	0.40 J	0.19	0.61	0.76	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.65	0.76	1
14478	Perfluoro-octanesulfonate	1763-23-1	4.1	0.19	0.62	0.76	1
14478	Perfluorooctanoic acid	335-67-1	0.40 J	0.19	0.65	0.76	1
Wet Ch	•	M 2540 G-1997 Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	1.3	0.50	0.50	0.50	1
		s in weight of the sample after The moisture result reported i					

#### **Sample Comments**

	Laboratory Sample Analysis Record									
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor			
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18191003	07/12/2018 03:07	Joshua P Trost	1			
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	2	18191003	07/10/2018 09:10	Courtney J Fatta	1			
00111	Moisture	SM 2540 G-1997 %Moisture Calc	2	18186820004A	07/05/2018 11:42	Larry E Bevins	1			

### DATA VALIDATION WORKSHEET

			DATA VALIDATION WORKSHEET				
Reviewer:	Victoria Kir	kpatrick	Perfluorinated Compounds by LC/MS/MS	Project Name:		Fresno	
Date:	07/25/	18		<b>Project Number:</b>	(	60520893	
DV Level:	<u>II</u> III	ĪV		Laboratory:		Eurofins	
		50°				FSA84,	
Review Doc				SDG No.:		308,10,1	
_ <u>X</u> Nati	onal Functiona	ıl Guidelin	es for Organic Data Review	Test Name:	Pl	FOA/PFO	OS
1.0 Laborat	tory Deliverab	les			Yes	No	NA
1.1	Do Chain-of-	Custody f	orms list all samples that were analyzed?		$X_{i}$		
1.2	Are all Chair	-of-Custo	ly forms signed, indicating sample chain-of-custody was maintaine	d?	. X		
1.3	Do sample pr	eservation	, collection and storage condition meet method requirement? 4±2°C	3	v		
1.5	If samples we	If >20°C, J(+)/R(-)	X				
1,4	Do the traffic	Reports,	chain-of-custody, and lab narrative indicate any problems with sai	mple receipt, condition of		v	
1,4	samples, ana	lytical prol	plems or special circumstances affecting the quality of the data?			Λ.	
Notes:							
2.0 Holding	Times				Yes	No	NA
0.1	Have any tec	hnical hole	ling times, determined from date of sampling to date of analysis, be	en exceeded? If yes,			
2.1	J(+)/UJ(-). 1	Extraction	14 days; Analysis: 40 days.			X	
2.2	Have any tec	hnical hole	ling time grossly (twice the holding time) been exceeded? If yes, Jo	(+)/R(-).		X	
Notes:							
							14.5
3.0 Blanks (	Laboratory ar	d Field)			Yes	No	NA
3.1			(IB) prepared at the appropriate frequency (one per 20 samples, per	batch per matrix?)	X		
3.2			nave positive results?		essees v anneae	* X	
3.3			blanks/trip blanks have positive results? If yes, use same rules about	ove.	X	No. of the	
Notes:					-		·
			······································				
***************************************							

4.0 Initial a	and Continuing Calibration	Yes	No	NA
4.1	Are at least five standards included in the calibration curve? If no, flag "R".			X
4.2	Was the retention time window for each analyte and surrogate set using the midpoint standard of the curve?			X
4.3	Was the relative retention time of each analyte within ±0.06 RRT units of the ICAL?			X
4.4	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".			X
4.5	Were continuing calibration standards analyzed every 12 hours or ten samples and at the end of the sequence? If no, flag "R".			X
4.6	Are all calibration standard %RSD ( $<\pm20\%$ ICAL, r>0.995, or r <sup>2</sup> <0.990), second source ( $\pm30\%$ ) or %D( $\pm20\%$ ) within the control limits?			X
Equipidal o	alibration. Each galibration point, avant those less than 2x MPI, should salaulate to be 2007, 12007, of the two value (	-2 × 3 / D T	. 5007 1	5007

For initial calibration: Each calibration point, except those less than 2x MRL should calculate to be 80%-120% of the true value. (<2x MRL: 50%-150%) For second source: %D>30%, J(+)/R(-).

For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).

Notes: The ICAL anomaly was low-point %D positive bias. All pos sample results >> [low-point]. No flag needed

5.0 Labora	0 Laboratory Control Sample (LCS)			
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	* (* <b>X</b> **.)		
5.2	Are there any %R for LCS/LCSD recoveries outside the laboratory QC limits(lab default is 70%-130%)?			
5.2	Action: If Yes, for %R >130, K(+) only; for %R 30%-70%, L(+)/UL(-), and %R<30%, L(+)/R(-).		A	
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		X	
Notes:				

6.0 Surrogate Recovery/Internal Standard Area Count Yes NA No Are surrogate recoveries within acceptance criteria for all samples and method blanks (±30%)? X 6.1 If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed? 6.2 X If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.) <10% high low 6.3 Positives L L UL R Non-detects No action 6.4 Has the internal standard area count been met for all quality control and field samples? (50%-200%) If not, (J+/UJ-) X Is the internal standard retention time for every QC criteria and sample been met? (±60 seconds from retention time 6.5 of the IS from the ICAL mid-point standard)? If no, samples should be reanalyzed.

Notes:

Matrix	Spike/Matrix Sp	ike Duplicate (MS/I	MSD)		Yes	No	NA
7.1	Were matrix sp	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?					
7.2	Are there any						
	%Recovery:	<30%	30%-70%	>130%	X		l
	Action:	J-(+)/R(-)	J-(+)/UJ(-)	J+(+) only			
7.3	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits? (±30%)						
	Action: No action is required based on MS/MSd failure alone. Note in the report and use professional judgement.						

Notes:

8.0 Field/L	8.0 Field/Laboratory Duplicates				
8.1	Evaluate field duplicate results? If no, $J(+)$ parent sample/field duplicate only.	$\mathbf{X}$			
Notes:					

Notes:

9.0 C	9.0 Compound Identification/Tune and Detection Limit Verification				NA
	9.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors	v		
9.1	and moisture (including adjustment of wet weight aliquot)?	Λ			
	9.2	Was a mass calibration performed daily prior to analysis?	X		

Notes:

10.0 Data C	ompleteness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$ )	in the state of th	$\mathbf{X}$		
10.1.1	Number of samples: 56				
10.1.2	Number of target compounds in each analysis:6				
10.1.3	Number of results rejected or not reported: 0				
	% Completeness = $(10.1.1 \times 10.1.2 - 10.1.3) \times 100/(10.1.1 \times 10.1.2)$				
	% Completeness =100%				

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## **Quality Control Summary**

Client Name: AECOM Reported: 04/15/2018 22:06 Group Number: 1926405

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/)	ng/l	ng/i	ng/l
Batch number: 18093009	Sample num	ber(s): 9536572	2	
Perfluorobutanesulfonate	N.D.	0.30	1.0	1.0
Perfluoroheptanoic acid	N.D.	0.30	1,0	1.0
Perfluorohexanesulfonate	N.D.	0.40	2.0	2.0
Perfluorononanoic acid	N.D.	0.40	2.0	2.0
Perfluoro-octanesulfonate	N.D.	0.60	2.0	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0	1.0

#### LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18093009	Sample number(	(s): 9536572			/	/			
Perfluorobutanesuifonate	4.81	4.34	4.81	4.31	96	90	70-130	1	30
Perfluoroheptanoic acid	5.44	5,19	5.44	4.79	95	88	70-130	<sup>*</sup> 8	30
Perfluorohexanesulfonate	5.14	4.66	5,14	5.19	91	101	70-130	11	30
Perfluorononanoic acid	5,44	5.53	5.44	5.08	102	93	70-130	8	30
Perfluoro-octanesulfonate	5.20	4.58	5.20	4.40	88	85	70-130	4	30
Perfluorooctanoic acid	5.44	5.12	5.44	5.22	94	96	70-130	2	30

#### **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD

Batch number: 18093009

Datorriumb	13C3-F %Rec		13C3-F %Rec	PFHxS LOD (ng/l)	13C4-F %Rec	FHpA LOD (ng/l)	13C8-F %Rec	PFOA LOD (ng/l)	13C8-F %Rec	PFOS LOD (ng/l)	13C9-F %Rec	
9536572 Blank	85 69	9.8	-87 70	9.8	86 73	2.0	83.— 70	2.0	74 73	9.8	-76 69	2.0
LCS LCSD	78 72	10 10	86 73	10 10	83 79	2.0 2.0	86 78	2.0 2.0	79 78	10 10	82 83	2.0

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

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# **Quality Control Summary**

Client Name: AECOM Reported: 06/06/2018 15:53 Group Number: 1945536

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/g	ng/g	ng/g	ng/g
Batch number: 18141016	Sample number	er(s): 9618850	-9618856,9618	859-9618860
Perfluorobutanesulfonate	Ŋ∕Ó.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80
	ng/l	ng/l	ng/l	ng/l
Batch number: 18141012	Sample number	er(s): 9618849	9618857	
Perfluorobutanesulfonate	NJO.	0.30	1.1	2.0
Perfluoroheptanoic acid	N.D.	0.30	1.2	2.0
Perfluorohexanesulfonate	N.D.	0.40	1.1	2.0
Perfluorononanoic acid	<b>N</b> .D.	0.40	1.2	2.0
Perfluoro-octanesulfonate	N.D.	0.60	2.3	3.0
Perfluorooctanoic acid	N.D.	0.30	1.2	2.0

#### LCS/LCSD

Analysis Name	LCS Spike Added ng/g	LCS Conc ng/g	LCSD Spike Added ng/g	LCSD Conc ng/g	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18141016	Sample number(	s): 9618850-9	618856,9618859-9	618860					
Perfluorobutanesulfonate	1.20	1.13	1.20	1.23	94	103	70-130	/8	30
Perfluoroheptanoic acid	1.36	1.57	1.36	1.58	115	116	70-130	1	30
Perfluorohexanesulfonate	1.29	1.18	1.29	1.29	92	101	70-130	9	30
Perfluorononanoic acid	1.36	1.48	1.36	1.49	108	109	70-130	1	30
Perfluoro-octanesulfonate	1.30	1.18	1,30	1.34	91	103	70-130	12	30
Perfluorooctanoic acid	1.36	1.52	1.36	1.37	112	101	70-130	10	30
•	ng/l	ng/l	ng/l	ng/l		•			
Batch number: 18141012	Sample number(	s): 9618849,9	618857						
Perfluorobutanesulfonate	4.81	5.93			123		70-130		
Perfluoroheptanoic acid	5.44	7.22			(133*)		70-130		
Perfluorohexanesulfonate	5.14	5.86			114		70-130		
Perfluorononanoic acid	5.44	6.96			128		70-130		
Perfluoro-octanesulfonate	5.20	5.73			110		70-130		

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

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## **Quality Control Summary**

Client Name: AECOM Reported: 06/06/2018 15:53 Group Number: 1945536

## LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorooctanoic acid	5.44	7.26			133*		70-130		
	%	%	%	%					
Batch number: 18142820005A	Sample number(s	): 9618850							
Moisture	89.5	89.43			100		99-101		
Batch number: 18142820005B	Sample number(s	): 9618851-9	618856,9618859-9	618860					
Moisture	89.5	89.43			100		99-101		

#### MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/g	MS Spike Added ng/g	MS Conc ng/g	MSD Spike Added ng/g	MSD Conc ng/g	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 18141016	Sample number	er(s): 9618850-	9618856,9	618859-9618860	UNSPK:	P617478 N	A Not	froms	ite	
Perfluorobutanesulfonate	0.264	1.19	1.59		-	111		70-130		
Perfluoroheptanoic acid	0.682	1.35	2.63			145*		70-130		
Perfluorohexanesulfonate	5.10	1.27	7.62			198 (2)		70-130		
Perfluorononanoic acid	1.87	1.35	3.82			145*		70-130		
Perfluoro-octanesulfonate	135.49	1.29	167.14			2459 (2)		70-130		
Perfluorooctanoic acid	3.00	1.35	5.16			160*		70-130		
	ng/l	ng/i	ng/l	ng/l	ng/l		- n i-40			
Batch number: 18141012	Sample number	er(s): 9618849,	9618857 U	NSPK_P617470	" N/A	Not from	12116			
Perfluorobutanesulfonate	0.755	4.21	5.59	4.19	5.30	115	108	70-130	5	30
Perfluoroheptanoic acid	N.D.	4.75	5.78	4.74	6.14	122	130	70-130	6	30
Perfluorohexanesulfonate	0.905	4.50	5.56	4.48	5.75	104	108	70-130	3	- 30
Perfluorononanoic acid	0.490	4.75	5.82	4.74	6.70	112	131*	70-130	14	30
Perfluoro-octanesulfonate	N.D.	4.54	5.33	4.53	5.64	117	125	70-130	6	30
Perfluorooctanoic acid	0.542	4.75	6.12	4.74	6.61	117	128	70-130	8	30

### **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max
•	%	% `		

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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## **Quality Control Summary**

Client Name: AECOM Reported: 06/06/2018 15:53 Group Number: 1945536

### **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

**DUP RPD Analysis Name BKG Conc DUP Conc DUP RPD Max** % Batch number: 18142820005A Sample number(s): 9618850 BKG: 9618850 5 2.51 2.30 Moisture Sample number(s): 9618851-9618856,9618859-9618860 BKG: 9618856 Batch number: 18142820005B Moisture 3.31 3.10

## **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD Batch number: 18141012

	13C3-F	PFBS	13C3-F	PFHxS	13C4-F	PFHpA	13C8-F	PFOA	13C8-F	FOS	13C9-F	PFNA
	%Rec	LOD (ng/l)	%Rec	LOD (ng/l)								
9618849	90	9.4	96	9.4	99	1.9	95	1.9	94 /	9.4	/119	1.9
9618857	86	9.1	84	9.1	84	1.8	88	1.8	92 ´	9.1	<sup>*</sup> 103	1.8
Blank	90	10	95	10	89	2.0	96	2.0	95	10	123	2.0
LCS	91	10	99	10	97	2.0	98	2.0	100	10	125	2.0
MS	194*	8.7	91	8.7	93	1.7	92	1.7	94	8.7	113	1.7
MSD	222*	8.7	96	8.7	94	1.7	92	1.7	96	8.7	111	1.7
Limits:	50-15	0	50-15	0	50-15	0	50-15	i0	50-15	0	50-15	0

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18141016

13C3-PFBS

13C3-PFB

	13C3-	-PFBS	13C3-F	PFHxS	13C4-F	PFHpA	13C8-F	PĘOA	13C8-F	PFOS	13C9-F	FNA
	%Red	: LOD	%Rec	LOD.	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD
		(ng/g)		(ng/g)		_(ng/g)		(ng/g)	_	(ng/g)		(ng/g)
9618850	54	1.2	_58	1.2	59	1.2	62	1.2	60	1.8	79	0.80
9618851	56	0.57	66	0.57	64	0.57	62	0.57	69	0.86	75	0.38
9618852	61	0.59	73	0.59	69	0.59	68	0.59	71	0.89	79	0.40
9618853	64	0.58	75	0.58	69	0.58	74	0.58	73	0.87	78	0.39
9618854	65	0.56	77	0.56	71	0.56	74	0.56	77	0.83	90	0.37
9618855	65	0.56	79	0.56	76	0.56	78	0.56	78	0.83	93	0.37
9618856	65	0.56	80	0.56	77	0.56	73	0.56	73	0.84	78	0.37
9618859	53	0.59	63	0.59	60	0.59	60	0.59	60	0.89	73	0.40
9618860	÷63	1.2	78	1.2	76	1.2	71	1.2	67	1.8	81	0.80
Blank	59	1.2	73	1.2	67	1.2	68	1.2	72	1.8	81	0.80
LCS	68	1.2	80	1.2	74	1.2	76	1.2	79	1.8	94	0.80
LCSD	60	1.2	71	1.2	71	1.2	72	1.2	69	1.8	79	0.80

<sup>\*-</sup> Outside of specification

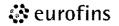
<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.



# Analysis Report

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## **Quality Control Summary**

Client Name: AECOM

Reported: 06/06/2018 15:53

Group Number: 1945536

## **Surrogate Quality Control (continued)**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Limits:	50-150	50-150	50-150	50-150	50-150	50-150	
MS	62 0,59	75 0.59	72 0,59	72 0,59	75 0.89	85 0.40	
	(ng/g)	(ng/g)	(ng/g)	(ng/g)	(ng/g)	(ng/g)	
	%Rec LOD	%Rec LOD	%Rec LOD	%Rec LOD	%Rec LOD	%Rec LOD	
	13C3-PFBS	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS	13C9-PFNA	
Datennam	DGI. IOITIOIO						

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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# **Quality Control Summary**

Client Name: AECOM Group Number: 1946800 Reported: 06/08/2018 13:45

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/g	ng/g	ng/g	ng/g
Batch number: 18144014	Sample num	ber(s): 9623953	3-9623968	
Perfluorobutanesulfonate	M.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	<b>N</b> .D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80
Batch number: 18144015	Şample num	ber(s): 9623969	9-9623980	
Perfluorobutanesulfonate	N.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80

#### LCS/LCSD

Analysis Name	LCS Spike Added ng/g	LCS Conc ng/g	LCSD Spike Added ng/g	LCSD Conc ng/g	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18144014	Sample number	(s): 9623953-9	9623968		/				
Perfluorobutanesulfonate	1.20	1.20	1.20	1.22	100	102	70-130	_2	30
Perfluoroheptanoic acid	1.36	1.48	1.36	1.47	109	108	70-130	1	30
Perfluorohexanesulfonate	1.29	1.27	1.29	1.25	99	97	70-130	1	30
Perfluorononanoic acid	1.36	1.51	1.36	1.48	111	109	70-130	2	30
Perfluoro-octanesulfonate	1.30	1.35	1.30	1.31	104	101	70-130	3	30
Perfluorooctanoic acid	1.36	1.37	1.36	1.43	101	105	70-130	4	30
Batch number: 18144015	Sample number(	(s): 9623969-9	9623980		_				
Perfluorobutanesulfonate	1.20	1.22			102		70-130		
Perfluoroheptanoic acid	136	1.45			107		70-130		
Perfluorohexanesulfonate	1.29	1,25			97		70-130		
Perfluorononanoic acid	1.36	1.46			108		70-130		
Perfluoro-octanesulfonate	1.30	1.28			99		70-130		
Perfluorooctanoic acid	1.36	1.41			104		70-130		

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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# **Quality Control Summary**

Client Name: AECOM Reported: 06/08/2018 13:45

্ত

Group Number: 1946800

## LCS/LCSD (continued)

Analysis Name	LCS Spike Added %	LCS Conc %	LCSD Spike Added %	LCSD Conc %	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18144820005A	Sample number(	s): 9623975-9	9623980						
Moisture	89.5	89.39			100		99-101		
Batch number: 18144820006A	Sample number(	s): 9623953-9	9623961						
Moisture	89.5	89.41			100		99-101		
Batch number: 18144820006B	Sample number(	s): 9623962-9	9623974						
Moisture	89.5	89.41			100		99-101		
Moisture	89.5	89.41			100		99-101		
Moisture Duplicate	89.5	89.41			100		99-101		

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/g	MS Spike Added ng/g	MS Conc ng/g	MSD Spike Added ng/g	MSD . Conc ng/g	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 18144014	Sample number	er(s): 9623953-	9623968 U	NSPK: 9623953						
Perfluorobutanesulfonate	N.D.	1.13	1.22			108		70-130		
Perfluoroheptanoic acid	0.342	1.28	1.64			101		70-130		
Perfluorohexanesulfonate	0.965	1.21	2.07			91		70-130		
Perfluorononanoic acid	N.D.	1.28	1.36			106		70-130		
Perfluoro-octanesulfonate	9.76	1.23	9.69			-5-(2)		70-130		
Perfluorooctanoic acid	0.630	1.28	1.95			103		70-130		
Batch number: 18144015	Sample numbe	er(s): 9623969-	9623980 <b>U</b>	NSPK: 9623971						
Perfluorobutanesulfonate -	N.D.	1.19	1.16	1.15	1.17	97 .	102	70-130	2	30
Perfluoroheptanoic acid	0.413	1.35	1.59	1.30	1.46	87	81	70-130	8	30
Perfluorohexanesulfonate	4.64	1.27	4.28	1.23	2.20	(-27*)	(198*)	70-130	(64*)	30
Perfluorononanoic acid	1.17	1.35	2.76	1.30	2.74	118	121	70-130		30
Perfluoro-octanesulfonate	69.18	1.29	107.93	1.24	36.34	3011-(2)	-2652(2)	70-130	2000	30
Perfluorooctanoic acid	4.64	1.35	8.97	1.30	2.28	321*	(-181*)	70-130	119*	) 30

## **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max
	%	%		

<sup>\*-</sup> Outside of specification

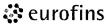
<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.



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# **Quality Control Summary**

Group Number: 1946800 Client Name: AECOM

Reported: 06/08/2018 13:45

## **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc %	DUP Conc %	DUP RPD	DUP RPD Max
Batch number: 18144820005A	Sample number(s): 9623	975-9623980 BKG: P6	22850	
Moisture	3.51	3.52	0	5
Batch number: 18144820006A	Sample number(s): 9623	953-9623961 BKG: 96	23958	
Moisture	4.31	5.13	(17*)	5
Batch number: 18144820006B	Sample number(s): 9623	962-9623974 BKG: 96	23971, P623971	
Moisture	1.84	1.94	5 (1)	5
Moisture	1.84	1.94	5 (1)	5
Moisture Duplicate	1.84	1.94	5 (1)	5

## **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Soil by LC/MS/MS-DoD Batch number: 18144014

Batten numbe	13C3-F		13C3-F	PFHxS	13C4-F	PFHpA	13C8-	PFOA	13C8-F	PFOS	13C9-F	PENA
	%Rec	LOD	%Rec		%Rec	LOD	%Rec		%Rec	LOD	%Rec	LOD
		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)
9623953	80	0.58	79	0.58	76	0.58	.76	0.58	81	0.87	82	0.38
9623954	75	0.58	<b>7</b> 6	0.58	74	0.58	72	0.58	79	0.87	75	0.39
9623955	71	0.56	74	0.56	72	0.56	74	0.56	73	0.83	72	0.37
9623956	74	0.59	78	0.59	76	0.59	75	0.59	76	0.89	74	0.40
9623957	79	0.59	79	0.59	77	0.59	78	0.59	83	0.88	81	0.39
9623958	78	0.57	77	0.57	79	0.57	78	0.57	78	0.85	80	0.38
9623959	85	0.56	83	0.56	82	0.56	84	0.56	86	0.84	85	0.37
9623960	76	0.56	79	0.56	80	0.56	76	0.56	79	0.84	83	0.37
9623961	81	0.58	78	0.58	83	0.58	80	0.58	84	0.87	87	0.38
9623962	83	0.56	86	0.56	88	0.56	86	0.56	93	0.84	97	0.37
9623963	86	0.57	89	0.57	88	0.57	. 88	0.57	90	0.85	92	0.38
9623964	82	1.2	87	1.2	86	1.2	78	1.2	80	1.8	85	0.80
9623965	86	0.58	84	0.58	87	0.58	84	0.58	90 .	0.87	121	0.38
9623966	76	0.55	79	0.55	78	0.55	76	0.55	83	0.82	77	0.36
9623967	76	0.59	. 82	0.59	75	0.59	79	0.59	76 .	0.88	79	0.39
9623968	85	0.55	88	0.55	89	0.55	86	0.55	94	0.82	97	0.36
Blank .	72	1.2	78	1.2	78	1.2	. 78	1.2	76	1.8	80	0.80
LCS	76	1.2.	78	1.2	78	1.2	81	1.2	. 87	1.8	80	0.80
LCSD	75	1.2	83	1.2	80	1.2	83	1.2	79	1.8	87	0.80
MS	75	0.57	76	0.57	77	0.57	77	0.57	80	0.85	80	0.38

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

50-150

50-150

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## **Quality Control Summary**

Client Name: AECOM Reported: 06/08/2018 13:45 Group Number: 1946800

50-150

50-150

## **Surrogate Quality Control**

50-150

50-150

50-150

50-150

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

50-150

50-150

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

50-150

50-150

Batch number: 18144014

Limits:

Limits:

	13C3-F	PFBS	13C3-	PFHxS	13C4-F	PFHpA	13C8-	PFOA	13	C8-PFOS	13C9-F	PFNA
	%Rec	LOD	%Rec	LOD	%Rec	LÓD	%Rec	LOD	%F	Rec LOD	%Rec	LOD
		(ng/g)		(ng/g)	,	(ng/g)	_	(ng/g)		(ng/g)		(ng/g)
9623969	81/	0.57	74	0.57	<b>,69</b>	0.57	/12	0.57	74	0.86	71	0.38
9623970	94	0.59	/ 92	0.59	89	0.59	92	0.59	91	0.89	<b>.</b> 90	0.40
9623971	82	0.58	78	0.58	76	0.58	80	0.58	82	0.87	82	0.39
9623972	73	0.59	68 <sup>.</sup>	0.59	68	0.59	67	0.59	72	0.89	70	0.40
9623973	77	0.57	72	0.57	69	0.57	71	0.57	75	0.86	70	0.38
9623974	86	0.57	83	0.57	82	0.57	76	0.57	87	0.86	79	0.38
9623975	87	0.59	86	0.59	. 77	0.59	79	0.59	87	0.89	78	0.40
9623976	97	1.2	94	1.2	96	1.2	93	1.2	95	1.8	96	0.80
9623977	87	0.56	83	0.56	72	0.56	72	0.56	85	0.83	74	0.37
9623978	86	0.56	82	0.56	80	0.56	83	0.56	. 84	0.84	83	0.37
623979	97	0.59	97	0.59	87	0.59	92	0.59	98	0.89	96	0.40
9623980	90	0.58	91	0.58	89	0.58	85	0.58	91	0.87	92	0.38
Blank	86	1.2	73	1.2	78	1.2	77	1.2	81	1.8	79	0.80
.cs	84	1.2	81	1.2	81	1.2	84	1.2	87	1.8	90	0.80
MS	73	0.59	68	0.59	: 68	0.59	67	0.59	72	0.89	70 g	0.40
MSD	77	0.57	72	0.57	69	0.57	71	0.57	75	0.86	70	0.38

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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## **Quality Control Summary**

Client Name: AECOM Group Number: 1946801 Reported: 06/06/2018 21:12

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/g	ng/g	ng/g	ng/g
Batch number: 18144015	Şample num	ber(s): 9623981	1-9623982,962	23984
Perfluorobutanesulfonate	N.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D	0.20	0.68	0.80
	ng/l	ng/l	ng/l	ng/l
Batch number: 18144010	Sample num	ber(s): 9623983	3	
Perfluorobutanesulfonate	NHD.	0.30	1.1	2.0
Perfluoroheptanoic acid	N.D.	0.30	1.2	2.0
Perfluorohexanesulfonate	N.D.	0.40	1.1	2.0
Perfluorononanoic acid	N.D.	0.40	1.2	2.0
Perfluoro-octanesulfonate	N.D.	0.60	2.3	3.0
Perfluorooctanoic acid	N.D.	0.30	1.2	2.0

#### LCS/LCSD

Analysis Name	LCS Spike Added ng/g	LCS Conc ng/g	LCSD Spike Added ng/g	LCSD Conc ng/g	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18144015	Sample number(	s): 9623981-9	623982,9623984						
Perfluorobutanesulfonate	1.20	1.22			1б2		70-130		
Perfluoroheptanoic acid	1.36	1.45			107		70-130		
Perfluorohexanesulfonate	1.29	1.25		•	97		70-130		
Perfluorononanoic acid	1.36	1.46			108		70-130		
Perfluoro-octanesulfonate	1.30	1.28			99		70-130		
Perfluorooctanoic acid	1.36	1.41			104		70-130		
	ng/l	ng/l	ng/l	ng/l					
Batch number: 18144010	Sample number(	s): 9623983				/			
Perfluorobutariesulfonate	4.81	4.45		-	92		70-130		
Perfluoroheptanoic acid	5.44	5.88			108		70-130		
Perfluorohexanesulfonate	5.14	4.72			92	4	70-130		
Perfluorononanoic acid	5.44	5.62			103		70-130		
Perfluoro-octanesulfonate	5.20	5.00			96		70-130		

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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## **Quality Control Summary**

Client Name: AECOM

Reported: 06/06/2018 21:12

Group Number: 1946801

### LCS/LCSD (continued)

Analysis Name  Perfluorooctanoic acid	LCS Spike Added ng/l 5.44	LCS Conc ng/l 5.54	LCSD Spike Added ng/I	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18144820007A	· ·	•	<b>%</b> 9623982,9623984	%					
Moisture	89.5	89.43			100		99-101		

#### MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/g	MS Spike Added ng/g	MS Conc ng/g	MSD Spike Added	MSD Conc ng/g	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
	119/9	rig/g	rig/g	<b>ng/g</b> 623984 UNSPK: 1 15	iig/g	MILA NO	rt from S	site.		
Batch number: 18144015	Sample numbe	er(s): 9623981-	9623982,96	623984 UNSPK:	P623971	10//1 110	7,0			
Perfluorobutanesulfonate	N.D.	1.19	1.16	1.15	1.17	97	102	70-130	2	30
Perfluoroheptanoic acid	0.413	1.35	1.59	1.30	1.46	87	81	70-130	8	30
Perfluorohexanesulfonate	4.64	1.27	4.28	1.23	2.20	-27*	-198*	70-130	64*	30
Perfluorononanoic acid	1.17	1.35	2.76	1.30	2.74	118	121	70-130	1	30
Perfluoro-octanesulfonate	69.18	1.29	107.93	1.24	36,34	3011 (2)	-2652 (2)	70-130	99*	30
Perfluorooctanoic acid	4.64	1.35	8.97	1.30	2.28	321*	-181*	70-130	119*	30
	ng/l	ng/l	ng/l	ng/l	ng/l					
Batch number: 18144010	Sample numbe	er(s): 9623983	UNSPK: P	320952						
Perfluorobutanesulfonate	N.D.	4.20	4.24	4.28	4.34	101	101	70-130	2	30
Perfluoroheptanoic acid	0.310	4.75	5.39	4.84	5.11	107	99	70-130	5	30
Perfluorohexanesulfonate	N.D.	4.49	4.49	4.58	4.66	100	102	70-130	4	30
Perfluorononanoic acid	N.D.	4.75	5.02	4.84	4.93	106	102	70-130	2	30
Perfluoro-octanesulfonate	N.D	4.54	4.87	4.63	5.14	107	111	70-130	5	30
Perfluorooctanoic acid	0.784	4.75	5.83	4.84	5.94	106	107	70-130	2	30

### **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

 
 Analysis Name
 BKG Conc %
 DUP Conc %
 DUP RPD
 DUP RPD Max

 Batch number: 18144820007A Moisture
 Sample number(s): 9623981-9623982,9623984
 BKG: P624678
 W 14 8\*
 5

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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## **Quality Control Summary**

Client Name: AECOM Reported: 06/06/2018 21:12 Group Number: 1946801

## **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD

Batch	number:	18144010	

		PFBS	13C3-	PFHxS	13C4-F	PFHpA	13C8-	PFOA	13C8-	PFOS	13C9-1	PFNA	
	%Rec	LOD	%Rec	LOD	%Rec	LÓD	%Rec	LOD	%Rec	LOD	%Rec	LOD	
		(ng/l)		(ng/l)		(ng/l)		∕ (ng/l)		/(ng/l)	/	(ng/l)	
9623983	<b>/</b> 97	9.0	/77	9.0	77/	1.8	85 1	1.8	91	9.0	107	1.8	
Blank	86	10	87	10	85	2.0	87	2.0	89	10	89	2.0	
LCS	96	10	87	10	90	2.0	88	2.0	88	10	92	2.0	
MS	144	8.7	84	8.7	91	1.7	83	1.7	84	8.7	93	1.7	
MSD	150	8.9	84	8.9	90	1.8	90	1.8	91	8.9	105	1.8	
l imite:	50-15	50	50-15	in	50-15	n	50-19	50	50-15	in	50-15	in.	

### Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18144015

Limits:	50-15	50	50-15	ס	50-15	0	50-15	0	50-15	0	50-15	0
MSD	77	0.57	72	0.57	69	0.57	71	0.57	75	0.86	70	0.38
MS	73	0.59	68	0.59	68	0.59	67	0.59	72	0.89	70	0.40
LCS	84	1.2	81	1.2	81	1.2	84	1.2	87	1.8	90	0.80
Blank	86	1.2	73	1.2	78	1.2	77	1.2	81	1.8	79	0.80
9623984	89	0.55	88	0.55	88	0.55	86	0.55	89	0.82	93	0.36
9623982	102	0.59	94	0.59	94	0.59	<b>9</b> 3	0.59	99	0.89	93	0.40
9623981	85	0.59	<b>ජ</b> 1	0.59	80	0.59	81,	0.59	/82	0.89	<b>1</b> /8	0.40
		(ng/g)	/	(ng/g)		(ng/g)		(ng/g)	/	(ng/g)		(ng/g)
	%Rec		%Rec	LOD	%Rec		%Rec	LOD	%Rec		%Rec	
		PFBS	13C3-P			PFHpA	13C8-F		13C8-F		13C9-F	
Daten numb	EI. 1014	4013										

\*- Outside of specification

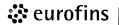
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.



# Analysis Report

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## **Quality Control Summary**

Client Name: AECOM Group Number: 1961420

Reported: 07/12/2018 16:08

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

## **Method Blank**

Analysis Name	Result 🦯	DL**	LOD	LOQ
	ng/g	ng/g	ng/g	ng/g
Batch number: 18191003	Sample numbe	r(s): 968623	2-9686236	
Perfluorobutanesulfonate	N.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80
	ng/l	ng/l	ng/l	ng/l
Batch number: 18184008	Sample numbe	r(s): 968621	9-9686231	
Perfluorobutanesulfonate	N.D.	0.30	1.1	2.0
Perfluoroheptanoic acid	N.D.	0.30	1.2	2.0
Perfluorohexanesulfonate	N.D.	0.40	1.1	2.0
Perfluorononanoic acid	N.D.	0.40	1.2	2.0
Perfluoro-octanesulfonate	N.D.	0.60	2.3	3.0
Perfluorooctanoic acid	N.D.	0.30	1.2	2.0

#### LCS/LCSD

LCS Spike Added ng/g	LCS Conc ng/g	LCSD Spike Added ng/g	LCSD Conc ng/g	LCS ' %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Sample number	(s): 9686232-9	9686236						
1.20	1.24			103		70-130		
1.36	1.45			107		70-130		
1.29	1.33			103		70-130		
1.36	1.40			103		70-130		
1.30	1.31			101		70-130		
1.36	1.45			106		70-130		
ng/l	ng/l	ng/l	ng/l					
Sample number(	s): 9686219-9	9686231						
4.81	4.60			96 1		72-127		
5.44	4.84			89		75-139		
5.14	4.66			91		71-130		
5.44	4.55			84		73-144		
5.20	4.36			84		67-134		
	Added ng/g  Sample number( 1.20 1.36 1.29 1.36 1.30 1.36  ng/l  Sample number( 4.81 5.44 5.14	Added conc ng/g ng/g  Sample number(s): 9686232-5 1.20 1.24 1.36 1.45 1.29 1.33 1.36 1.40 1.30 1.31 1.36 1.45 ng/l ng/l  Sample number(s): 9686219-5 4.81 4.60 5.44 4.84 5.14 4.66 5.44 4.55	Added ng/g ng/g ng/g  Sample number(s): 9686232-9686236  1.20 1.24  1.36 1.45  1.29 1.33  1.36 1.40  1.30 1.31  1.36 1.45  ng/l ng/l ng/l  Sample number(s): 9686219-9686231  4.81 4.60  5.44 4.84  5.14 4.66  5.44 4.55	Added conc ng/g ng/g ng/g ng/g  Sample number(s): 9686232-9686236  1.20 1.24  1.36 1.45  1.29 1.33  1.36 1.40  1.30 1.31  1.36 1.45  ng/l ng/l ng/l ng/l  Sample number(s): 9686219-9686231  4.81 4.60  5.44 4.84  5.14 4.66  5.44 4.55	Added ng/g         Conc ng/g         Added ng/g         Conc ng/g         %REC ng/g           Sample number(s): 9686232-9686236         1.20         1.24         103           1.36         1.45         107           1.29         1.33         103           1.36         1.40         103           1.30         1.31         101           1.36         1.45         106           ng/l         ng/l         ng/l           Sample number(s): 9686219-9686231         96           4.81         4.60         96           5.44         4.84         89           5.14         4.66         91           5.44         4.55         84	Added ng/g         Conc ng/g         Added ng/g         Conc ng/g         %REC ng/g	Added ng/g         Conc ng/g         Added ng/g         Conc ng/g         %REC         %REC         Limits           Sample number(s): 9686232-9686236         1.20         1.24         103         70-130           1.36         1.45         107         70-130           1.29         1.33         103         70-130           1.36         1.40         103         70-130           1.30         1.31         101         70-130           1.36         1.45         106         70-130           ng/l         ng/l         ng/l         ng/l           Sample number(s): 9686219-9686231         96         72-127           5.44         4.84         89         75-139           5.14         4.66         91         71-130           5.44         4.55         84         73-144	Added ng/g         Conc ng/g         Added ng/g         Conc ng/g         REC ng/g         REC ng/g         REC ng/g         Limits           Sample number(s): 9686232-9686236         1.20         1.24         103         70-130           1.36         1.45         107         70-130           1.29         1.33         103         70-130           1.36         1.40         103         70-130           1.30         1.31         101         70-130           1.36         1.45         106         70-130           ng/l         ng/l         ng/l         ng/l           Sample number(s): 9686219-9686231         4.81         4.60         96         72-127           5.44         4.84         89         75-139           5.14         4.66         91         71-130           5.44         4.55         84         73-144

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

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## **Quality Control Summary**

Client Name: AECOM Reported: 07/12/2018 16:08 Group Number: 1961420

### LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorooctanoic acid	5.44	5.35			98 ´		76-136		
	%	%	%	%					
Batch number: 18184820002B	Sample number(	s): 9686232-9	9686233						
Moisture	89.5	89.39			100 -		99-101		
Batch number: 18186820004A	Sample number(	s): 9686234-9	9686236						
Moisture	89.5	89.43			100		99-101		
Moisture	89.5	89.43			100		99-101		
Moisture Duplicate	89.5	89.43			100		99-101		

#### MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/g	MS Spike Added ng/g	MS Conc ng/g	MSD Spike Added ng/g	MSD Conc ng/g	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 18191003	Sample numbe	er(s): 9686232-	9686236 U	NSPK: 9686234	ļ					
Perfluorobutanesulfonate	N.D.	1.17	1.27	1.13	1.53	109	(135*)	70-130	19	30
Perfluoroheptanoic acid	N.D.	1.32	1.48	1.28	1.48	112	116	70-130	0	30
Perfluorohexanesulfonate	0.394	1.25	1.76	1.21	1.75	109	112	70-130	0	30
Perfluorononanoic acid	N.D.	1.32	1.54	1.28	1.45	117	113	70-130	6	30
Perfluoro-octanesulfonate	4.01	1.26	5.58	1.23	4.94	124	76	70-130	12	30
Perfluorooctanoic acid	0.396	1.32	1.91	1.28	1.87	115	115	70-130	2	30
	ng/l	ng/l	ng/l	ng/l	ng/l					
Batch number: 18184008	Sample numbe	er(s): 9686219-	9686231 U	NSPK: 9686227		/	/			
Perfluorobutanesulfonate	124.67	4.79	133.12	4.75	132.49	177 (2)	164 (2)	72-127	0	30
Perfluoroheptanoic acid	589.31	5.41	448.7	5.37	440.64	-2598 (2)	-2766 (2)	75-139	2	30
Perfluorohexanesulfonate	1348.37	5.12	1367.64	5.08	1321.64	3 <b>7</b> 7 (2)	-525 (2)	71-130	3	30
Perfluorononanoic acid	0.749	5.41	5.20	5.37	4.91	82-	77	73-144	6	30
Perfluoro-octanesulfonate	10.27	5.17	17.81	5.14	15.19	1462	96	67-134	16	30
Perfluorooctanoic acid	165.26	5.41	176.01	5.37	167.36	198 (2)	39-(2)	76-136	5	30

### **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

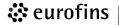
<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.



# Analysis Report

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## **Quality Control Summary**

Client Name: AECOM Group Number: 1961420 Reported: 07/12/2018 16:08

## **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc %	DUP Conc %	DUP RPD	DUP RPD Max
Batch number: 18184820002B	Sample number(s): 9686	232-9686233 BKG: 96	86234	
Moisture	1.19	1.48	22* (1)	5
Batch number: 18186820004A	Sample number(s): 9686	3234-9686236 BKG: 96	86234	
Moisture	1.34	1.54	14* (1)	5
Moisture	1.34	1.54	14* (1)	5
Moisture Duplicate	1.34	1.54	14* (1)	5

## **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD

Batch number: 18184008

	13C3-F	FBS	13C3-P	FHxS	13C4-P	FHpA	13C8-F	PFOA	13C8-F	PFOS	13C9-F	FNA /
	%Rec	LOD (ng/l)	%Rec	LOD (ng/l)	%Rec	LÓD ` (ng/l)	%Rec	LOD (ng/l)	%Rec	LOD (ng/l)	%Rec	LOD (ng/l)
9686219	123	10	73	10	93	2.0	94	2.0	109	10	148	2.0
9686220	93	8.5	80	8.5	86	1.7	90	1.7	86	8.5	110	1.7
9686221	97	8.9	87	8.9	91	1.8	96	1.8	97	8.9	121	1.8
9686222	90	8.8	82	8.8	91	1.8	91	1.8	92	8.8	112	1.8
9686223	66	85 (3)	84	85 (3)	83	17 (3)	88	17 (3)	90	85 (3)	101	17 (3)
9686224	67	100 (3)	83	100 (3)	83	20	92	20	98	100 (3)	99	20 `
9686225	102	9.3	95	9.3	96	1.9	104	1.9	101	9,3	118	1.9
9686226	100	10	79	10	87	2.0	108	2.0	108	10	129	2.0
9686227	101	10	53	10	56	2.0	94	2.0	99	10	120	2.0
9686228	98	9.9	51	9.9	53	2.0	89	2.0	98	9.9	124	2.0
9686229	98	9.9	52	9.9	53	2.0	91	2.0	98	9.9	125	2.0
9686230	80	10	55	10	64	2.0	78	2.0	79	10	104	2.0
9686231	101	8.8	80	8.8	88	1.8	102	1.8	109	8.8	143	1.8
Blank	81	10	78	10	78	2.0	83	2.0	89	10	98	2.0
LCS	91	10	88	10	92	2.0	97	2.0	95	10	105	2.0
MS	98	9.9	51	9.9	53	2.0	89	2.0	98	9.9	124	2.0
MSD	98	9.9	52	9.9	53	2.0	91	2.0	98	9.9	125	2.0
Limits:	50-15	0	50-150	)	50-150		50-15	0	50-15	0	50-15	)

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18191003

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.-



# Analysis Report

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## **Quality Control Summary**

Client Name: AECOM

Group Number: 1961420

Reported: 07/12/2018 16:08

## **Surrogate Quality Control (continued)**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18191003

	13C3-	PFBS /	13C3-	PFHxS	13C4-	PFHpA	13C8-	-PFOA _	13C8-	PFOS	13C9-	PFNA
	%Red	LOD (	%Rec	LOD /	%Rec	LÓD /	%Red	: LOD	%Red	: LOD 🗸	%Rec	LOD
		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)
9686232	80	0.55	72	0.55	74	0.55	72	0.55	78	0.82	94	0.36
9686233	74	0.59	74	0.59	71	0.59	75	0.59	75	0.88	88	0.39
9686234	66	0.57	63	0.57	53	0.57	57	0.57	71	0.85	64	0.38
9686235	74	0.58	74	0.58	53	0.58	58	0.58	77	0.87	65	0.39
9686236	70	0.57	70	0.57	55	0.57	57	0.57	70	0.85	59	0.38
Blank	73	1.2	71	1.2	70	1.2	76	1.2	71	1.8	72	0.80
LCS	75	1.2	75	1.2	71	1.2	74	1.2	73	1.8	71	0.80
MS	74	0.58	74	0.58	53	0.58	58	0.58	77	0.87	65	0.39
MSD	70	0.57	70	0.57	55	0.57	57	0.57	70	0.85	59	0.38
Limits:	50-1	50	50-1	50	50-15	50	50-1	50	50-1	50	50-1	50

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

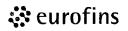


# **Quality Control Reference List PFAS Group**

CLIENT: AECOM SDG: FSB26

Fraction: PFAS by LC/MS/MS

Analysis PFAS in Soil by LC/MS/MS-DoD	Batch Number 18191003	Sample Number BLK191003B LCS191003Q 9686232 9686233 9686234 UNSPK 9686235 MS 9686236 MSD	Analysis Date 07/12/2018 00:16 07/12/2018 00:32 07/12/2018 02:20 07/12/2018 02:36 07/12/2018 03:07 07/12/2018 03:23 07/12/2018 03:38
PFAS in Water by LC/MS/MS-DoD	18184008	BLK184008B LCS184008Q 9686219 9686220 9686221 9686222 9686223 9686223 9686224 9686224 9686225 9686225 9686227 UNSPK 9686227 UNSPK 9686228 MS 9686229 MSD 9686230 9686231	07/06/2018 18:34 07/06/2018 18:19 07/06/2018 19:05 07/06/2018 19:21 07/06/2018 19:36 07/06/2018 20:07 07/09/2018 13:26 07/09/2018 13:42 07/09/2018 13:57 07/09/2018 14:13 07/06/2018 20:54 07/06/2018 21:10 07/06/2018 21:25 07/09/2018 14:28 07/06/2018 21:41 07/06/2018 21:56 07/06/2018 22:12 07/06/2018 22:12



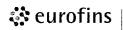
LOQ/MDL Summary PFAS Group

SDG: FSB26

Fraction: PFAS by LC/MS/MS

14478: PFAS in Soil by LC/MS/MS- DoD Analyte Name	Default DL	Default LOD	Default LOQ	Units
Perfluorooctanoic acid	.2	.68	0.80	ng/g
Perfluorononanoic acid	.2	.68	0.80	ng/g
Perfluoroheptanoic acid	.2	.68	0.80	ng/g
Perfluorobutanesulfonate	.2	.6	0.80	ng/g
Perfluorohexanesulfonate	.2	.64	0.80	ng/g
Perfluoro-octanesulfonate	.2	.65	0.80	ng/g

14434: PFAS in Water by LC/MS/MS-DoD Analyte Name	Default DL	Default LOD	Default LOQ	Units
Perfluorooctanoic acid	.3	1.2	2.0	ng/l
Perfluorononanoic acid	.4	1.2	2.0	ng/l
Perfluoroheptanoic acid	.3	1.2	2.0	ng/l
Perfluorobutanesulfonate	.3	1.1	2.0	ng/l
Perfluorohexanesulfonate	.4	1.1	2.0	ng/l
Perfluoro-octanesulfonate	.6	2.3	3.0	ng/l









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#### **SAMPLE INFORMATION**

**Client Sample Description** 

Sample Collection Date/Time ELLE#

F-Source Water - 03.28.2018 Water

03/28/2018 09:17

9536572

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.







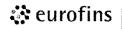


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#### **SAMPLE INFORMATION**

Client Sample Description	Sample Collection Date/Time	ELLE#
FR-EB-051618 Water	05/16/2018 13:25	9618849
FR-145-SB03-1 Soil	05/16/2018 15:40	9618850
FR-145-SB03-5 Soil	05/16/2018 16:00	9618851
FR-145-SB01-1 Soil	05/17/2018 13:15	9618852
FR-145-SB01-5 Soil	05/17/2018 13:26	9618853
FR-APR-SB01-1 Soil	05/17/2018 15:05	9618854
FR-APR-SB01-5 Soil	05/17/2018 15:40	9618855
FR-APR-SB01-5D Soil	05/17/2018 15:40	9618856
FR-FRB-051718 Water	05/17/2018 16:55	9618857
FR-APR-SB03-1 Soil	05/18/2018 11:15	9618859
FR-APR-SB03-5 Soil	05/18/2018 11:20	9618860

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.







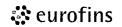


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#### SAMPLE INFORMATION

Client Sample Description	Sample Collection	ELLE#
	<u>Date/Time</u>	
FR-FTA-SB03-1 Soil	05/21/2018 09:30	9623953
FR-FTA-SB03-5 Soil	05/21/2018 09:40	9623954
FR-FTA-SB02-1 Soil	05/21/2018 10:40	9623955
FR-FTA-SB02-5 Soil	05/21/2018 10:50	9623956
FR-FTA-SB02-5D Soil	05/21/2018 10:50	9623957
FR-FTA-SB01-1 Soil	05/21/2018 11:53	9623958
FR-FTA-SB01-5 Soil	05/21/2018 12:03	9623959
FR-100-SB01-1 Soil	05/21/2018 14:10	9623960
FR-100-SB01-5 Soil	05/21/2018 14:20	9623961
FR-104-SB02-1 Soil	05/21/2018 14:40	9623962
FR-104-SB02-5 Soil	05/21/2018 14:58	9623963
FR-104-SB01-1 Soil	05/21/2018 15:10	9623964
FR-104-SB01-5 Soil	05/21/2018 15:20	9623965
FR-145-SB02-1 Soil	05/21/2018 16:00	9623966
FR-145-SB02-5 Soil	05/21/2018 16:15	9623967
FR-100-SB01-5D Soil	05/21/2018 14:20	9623968
FR-APR-SB02-1 Soil	05/22/2018 07:47	9623969
FR-APR-SB02-5 Soil	05/22/2018 07:58	9623970
FR-APR-SB04-1 Soil	05/22/2018 08:56	9623971
FR-APR-SB04-1 MS Soil	05/22/2018 08:56	9623972
FR-APR-SB04-1 MSD Soil	05/22/2018 08:56	9623973
FR-APR-SB04-5 Soil	05/22/2018 09:04	9623974
FR-APR-SB05-1 Soil	05/22/2018 09:40	9623975
FR-APR-SB05-5 Soil	05/22/2018 11:00	9623976
FR-157-SB02-1 Soil	05/22/2018 11:12	9623977
FR-157-SB02-1D Soil	05/22/2018 11:12	9623978
FR-157-SB01-1 Soil	05/22/2018 11:47	9623979
FR-157-SB01-5 Soil	05/22/2018 11:54	9623980

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.







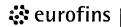


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#### **SAMPLE INFORMATION**

Client Sample Description	Sample Collection	ELLE#
	<u>Date/Time</u>	
FR-157-SB03-1 Soil	05/22/2018 12:18	9623981
FR-157-SB03-5 Soil	05/22/2018 12:25	9623982
FR-FRB-052218 Water	05/22/2018 14:25	9623983
FR-157-SB02-5 Soil	05/22/2018 11:25	9623984

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.









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#### **SAMPLE INFORMATION**

Client Sample Description	Sample Collection Date/Time	ELLE#
FR-EB-Rope-062618 Water	06/26/2018 11:10	9686219
FR-EB-Pump-062618 Water	06/26/2018 11:15	9686220
FR-EB-Sounder-062618 Water	06/26/2018 11:20	9686221
FR-EB-Tube-062618 Water	06/26/2018 11:25	9686222
FR-145-MW01D Water	06/26/2018 11:20	9686223
FR-145-MW01 Water	06/26/2018 11:20	9686224
FR-MWBP-09C Water	06/27/2018 09:09	9686225
FR-HFMW-46B Water	06/27/2018 12:00	9686226
FR-FTA-MW01 Water	06/29/2018 08:20	9686227
FR-FTA-MW01 MS Water	06/29/2018 08:20	9686228
FR-FTA-MW01 MSD Water	06/29/2018 08:20	9686229
FR-100-MW01 Water	06/29/2018 10:18	9686230
FR-FRB-1-062918 Water	06/29/2018 10:30	9686231
FR-OF4-SD01 Soil	06/29/2018 11:26	9686232
FR-OF4-SD01D Soil	06/29/2018 11:26	9686233
FR-OF1-SD01 Soil	06/29/2018 11:48	9686234
FR-OF1-SD01 MS Soil	06/29/2018 11:48	9686235
FR-OF1-SD01 MSD Soil	06/29/2018 11:48	9686236

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.



### Case Narrative

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Project Name: Fresno Phase II ELLE Group #: 1926405

#### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

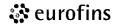
The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

#### **Analysis Specific Comments:**

#### EPA 537 mod QSM 5.1 table B-15, Misc. Organics

Sample #s: 9536572

The laboratory's DoD Scope of Accreditation does not include the following method: EPA 537 mod QSM 5.1 table B-15.



### Case Narrative

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Project Name: Fresno Phase II ELLE Group #: 1945536

#### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

#### **Analysis Specific Comments:**

#### EPA 537 mod QSM 5.1 table B-15, LC/MS/MS Miscellaneous

#### Sample #s: 9618852, 9618854

The following analytes were manually integrated due to incorrect integrations: Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Sample #s: 9618856

The following analytes were manually integrated due to incorrect integrations: Perfluorononanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Sample #s: 9618853

The following analytes were manually integrated due to incorrect integrations: Perfluorononanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Sample #s: 9618860

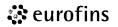
The following analytes were manually integrated due to incorrect integrations: Perfluoro-octanesulfonate

#### Sample #s: 9618850

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Sample #s: 9618851

The following analytes were manually integrated due to incorrect integrations:



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Perfluorooctanoic acid, Perfluorononanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Sample #s: 9618855, 9618859

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorononanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Batch #: 18141012 (Sample number(s): 9618849, 9618857 UNSPK: P617470)

The recovery(ies) for the following analyte(s) in the LCS exceeded the acceptance window indicating a positive bias: Perfluorooctanoic acid, Perfluoroheptanoic acid

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorononanoic acid

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) MS, MSD

#### Batch #: 18141016 (Sample number(s): 9618850-9618856, 9618859-9618860 UNSPK: P617478)

The recovery(ies) for the following analyte(s) in the MS exceeded the acceptance window indicating a positive bias: Perfluorooctanoic acid, Perfluorononanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

. , . . .

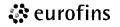
#### SM 2540 G-1997 %Moisture Calc, Wet Chemistry

#### Batch #: 18142820005A (Sample number(s): 9618850 BKG: 9618850)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture

#### Batch #: 18142820005B (Sample number(s): 9618851-9618856, 9618859-9618860 BKG: 9618856)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture



### Case Narrative

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Project Name: Fresno Phase II ELLE Group #: 1946800

#### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

#### Analysis Specific Comments:

#### EPA 537 mod QSM 5.1 table B-15, LC/MS/MS Miscellaneous

#### Sample #s: 9623954

The following analytes were manually integrated due to incorrect integrations: Perfluorobutanesulfonate, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623955, 9623959, 9623961, 9623968, 9623975

The following analytes were manually integrated due to incorrect integrations: Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s; 9623964, 9623965, 9623966, 9623967, 9623969, 9623970, 9623972, 9623976, 9623979

The following analytes were manually integrated due to incorrect integrations: Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Sample #s: 9623971

The following analytes were manually integrated due to incorrect integrations:

Perfluoronoanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623960, 9623974, 9623977, 9623978, 9623980

The following analytes were manually integrated due to incorrect integrations: Perfluorononanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Sample #s: 9623973

The following analytes were manually integrated due to incorrect integrations:



### Case Narrative

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Perfluorononanoic acid, Perfluoro-octanesulfonate

Sample #s: 9623953, 9623958

The following analytes were manually integrated due to incorrect integrations:

Perfluorooctanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623956, 9623957

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorohexanesulfonate

Sample #s: 9623962, 9623963

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Batch #: 18144014 (Sample number(s): 9623953-9623968 UNSPK: 9623953)

The recovery(ies) for the following analyte(s) in the MS were below the acceptance window: Perfluoro-octanesulfonate

Batch #: 18144015 (Sample number(s): 9623969-9623980 UNSPK: 9623971)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorooctanoic acid, Perfluoro-octanesulfonate

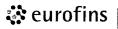
The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### SM 2540 G-1997 %Moisture Calc, Wet Chemistry

Batch #: 18144820006A (Sample number(s): 9623953-9623961 BKG: 9623958)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture



### Case Narrative

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Project Name: Fresno Phase II ELLE Group #: 1946801

#### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

#### **Analysis Specific Comments:**

#### EPA 537 mod QSM 5.1 table B-15, LC/MS/MS Miscellaneous

Sample #s: 9623981, 9623984

The following analytes were manually integrated due to incorrect integrations: Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623982

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorononanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Batch #: 18144015 (Sample number(s): 9623981-9623982, 9623984 UNSPK: P623971)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorooctanoic acid, Perfluoro-octanesulfonate

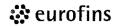
The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### SM 2540 G-1997 %Moisture Calc, Wet Chemistry

Batch #: 18144820007A (Sample number(s): 9623981-9623982, 9623984 BKG: P621828)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture



### Case Narrative

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-5765 • www.EurofineUS.com/LancLabaEnv

Project Name: Fresno Phase II ELLE Group #: 1961420

#### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

#### **Analysis Specific Comments:**

#### EPA 537 mod QSM 5.1 table B-15, LC/MS/MS Miscellaneous

Sample #s: 9686227, 9686228, 9686229, 9686235

The following analytes were manually integrated due to incorrect integrations: Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686232, 9686236

The following analytes were manually integrated due to incorrect integrations:

Perfluorocctanoic acid, Perfluorobutanesulfonate, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686225, 9686226, 9686233, 9686234

The following analytes were manually integrated due to incorrect integrations: Perfluoroctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686230

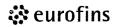
The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorononanoic acid, Perfluorobetanoic acid, Perfluorobetanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686219, 9686220, 9686221, 9686222

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorononanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686223, 9686224

Reporting limits were raised due to interference from the sample matrix.



### Case Narrative

2425 New Holland Pike, Lancaster, PA 17601 • 747-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

The following analytes were manually integrated due to incorrect integrations: Perfluoroctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Batch #: 18184008 (Sample number(s): 9686219-9686231 UNSPK: 9686227)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorobutanesulfonate, Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Perfluorooctanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate

#### Batch #: 18191003 (Sample number(s): 9686232-9686236 UNSPK: 9686234)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorobutanesulfonate

#### SM 2540 G-1997 %Moisture Calc, Wet Chemistry

Batch #: 18184820002B (Sample number(s): 9686232-9686233 BKG: 9686234)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture

Batch #: 18186820004A (Sample number(s): 9686234-9686236 BKG: 9686234)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture, Moisture, Moisture Duplicate

# 1945536

#### Kay Hower

From:

Tavantzis, Naoum <naoum.tavantzis@aecom.com>

Sent:

Tuesday, May 22, 2018 7:21 AM

To:

Kay Hower

Subject:

FW: AECOM: Fresno ANGB - do not analyze FR-144-SB02-1 from COC 20180518-1

#### **EXTERNAL EMAIL\***

Please do not analyze the sample mentioned below

#### **Naoum Tavantzis**

Project Chemist, Design & Consulting Services, DC Metro Area+ Chemistry Team Leader/ Practice Area Leader Geoenvironmental and Remediation Group D +1-919-461-1178 C +1-301-267-8761 naoum.tavantzis@aecom.com

#### **AECOM**

1600 Perimeter Park Drive, Suite 400, Morrisville, North Carolina 27560 T 919-461-1100 F 919-461-1415 www.aecom.com

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From: Correia, Daniel

Sent: Monday, May 21, 2018 11:28 PM

**To:** Tavantzis, Naoum **Cc:** Cardenas, Megan E

Subject: AECOM: Fresno ANGB - do not analyze FR-144-SB02-1 from COC 20180518-1

Hello Naoum,

I shipped a cooler of soil samples to your lab on Friday. I would like to follow-up on that sample shipment, and request that sample FR-145-SB02-1 not be analyzed. We had to move the sample location due to refusal at depth, and I've resampled the shallower soil for this location. The new sample will be in the cooler that will likely be shipped tomorrow, however, please do not analyze FR-145-SB02-1 from COC 20180518-1.

Thanks,

#### **Daniel Correia**

Geologist – Remediation Practice D 1-805-692-0671 C 1-805-245-9079 daniel.correia@aecom.com

#### **AECOM**



#### Sample Administration Receipt Documentation Log

Doc Log ID: 212529 

Group Number(s):

1926405

Client: Aecom

**Delivery and Receipt Information** 

Delivery Method:

Fed Ex

Arrival Timestamp:

03/31/2018 9:55

Number of Packages:

1

Number of Projects:

1

State/Province of Origin:

<u>VA</u>

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

**Custody Seal Present:** 

Yes

Sample Date/Times match COC:

Yes

**Custody Seal Intact:** 

Yes

VOA Vial Headspace ≥ 6mm:

N/A

Samples Chilled:

Yes

Total Trip Blank Qty:

0

Paperwork Enclosed:

Yes Yes

Air Quality Samples Present:

Nο

Samples Intact:

Missing Samples:

No Nο

Nο

Extra Samples:

Unpacked by Felix Gonzalez (13783) at 12:47 on 03/31/2018

Samples Chilled Details

Thermometer Types:

Discrepancy in Container Qty on COC:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler# 1

Thermometer ID DT42-01

Corrected Temp 1.0

Therm. Type DΤ

Ice Type Wet

Ice Present?

Ice Container Bagged

Elevated Temp? Ν



### Sample Administration Receipt Documentation Log

Doc Log ID:

216931

Group Number(s): 1945536

Client: AECOM

**Delivery and Receipt Information** 

**Delivery Method:** 

Fed Ex

Arrival Timestamp:

05/19/2018 10:00

Number of Packages:

1

Number of Projects:

1

State/Province of Origin:

<u>VA</u>

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

**Custody Seal Present:** 

Yes

Sample Date/Times match COC:

Yes N/A

**Custody Seal Intact:** Samples Chilled:

Yes Yes

VOA Vial Headspace ≥ 6mm: Total Trip Blank Qty:

0

Paperwork Enclosed:

Yes

Air Quality Samples Present:

No

Samples Intact:

Missing Samples:

Yes No

Extra Samples:

No Discrepancy in Container Qty on COC:

No

Unpacked by Simon Nies (25112) at 13:58 on 05/19/2018

Samples Chilled Details

Thermometer Types:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler # Thermometer ID

Corrected Temp 1.2

Therm. Type DT

Ice Type

Ice Present?

Ice Container

Elevated Temp?

DT42-02

Wet

Bagged

Ν



# Sample Administration Receipt Documentation Log

Doc Log ID:

217202

Group Number(s): 1946800

Client: AECOM

**Delivery and Receipt Information** 

Delivery Method:

Fed Ex

Arrival Timestamp:

05/23/2018 10:05

Number of Packages:

2

Number of Projects:

1

State/Province of Origin:

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

Custody Seal Present:

Yes

Sample Date/Times match COC:

Yes

Custody Seal Intact:

Yes

VOA Vial Headspace ≥ 6mm:

N/A

Samples Chilled:

Yes

Total Trip Blank Qty:

0

Paperwork Enclosed:

Yes Yes

Air Quality Samples Present:

No

Samples Intact: Missing Samples:

No

Extra Samples:

No

Discrepancy in Container Qty on COC:

No

Unpacked by Simon Nies (25112) at 17:04 on 05/23/2018

#### Samples Chilled Details

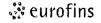
Thermometer Types:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler#	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	ice Present?	Ice Container	Elevated Temp?
1	DT42-02	1.9	TG	Wet	Υ	Bagged	N
2	DT42-02	5.4	DT	Wet	Υ	Bagged	N



# Sample Administration Receipt Documentation Log

Doc Log ID:

217202

Group Number(s): | 94680|

Client: AECOM

**Delivery and Receipt Information** 

**Delivery Method:** 

Fed Ex

Arrival Timestamp:

05/23/2018 10:05

Number of Packages:

2

Number of Projects:

1

State/Province of Origin:

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

**Custody Seal Present:** 

Yes

Sample Date/Times match COC:

Yes

Custody Seal Intact:

165

VOA Vial Headspace ≥ 6mm:

N/A

Samples Chilled:

Yes Yes

Total Trip Blank Qty:

0

Paperwork Enclosed:

Yes

Air Quality Samples Present:

No

Samples Intact:

Yes No

Missing Samples: Extra Samples:

No

Discrepancy in Container Qty on COC:

No

Unpacked by Simon Nies (25112) at 17:04 on 05/23/2018

Samples Chilled Details

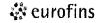
Thermometer Types:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT42-02	1.9	DT	Wet	Υ	Bagged	N
2	DT42-02	5.4	ÐΤ	Wet	Υ	Bagged	N



# Sample Administration Receipt Documentation Log

Doc Log ID:

220665

Group Number(s): 1961420

Client: AECOM

**Delivery and Receipt Information** 

Delivery Method:

Fed Ex

Arrival Timestamp:

06/30/2018 10:10

Number of Packages:

1

Number of Projects:

1

State/Province of Origin:

<u>VA</u>

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

Custody Seal Present:

Yes

Sample Date/Times match COC:

No

Custody Seal Intact:

Yes Yes VOA Vial Headspace ≥ 6mm:

N/A

0

Samples Chilled: Paperwork Enclosed:

Yes

Total Trip Blank Qty:
Air Quality Samples Present:

No

Samples Intact:

Yes

Missing Samples:

No

Extra Samples:

No

Discrepancy in Container Qty on COC:

No

Unpacked by Raysa Perez (14020) at 14:18 on 06/30/2018

Samples Chilled Details

Thermometer Types:

DT = Digital (Temp. Bottle)

6/29/2018 --

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler # Thermometer ID

1 DT146

Corrected Temp

Therm, Type

ice Type | Ice Present?

Ice Container

Elevated Temp?

FR-OF1-SD01

1.0

DT

Wet

Υ

Bagged

N

Sample Date/Time Discrepancy Details

Sample ID on COC Date/Time on Label FR-EB-ROPE-062618 6/26/2018 ---FR-EB-PUMP-062618 6/26/2018 ---FR-EB-SOUNDER-062618 6/26/2018 ---FR-EB-TUBE-062618 6/26/2018 ---FR-145-MW01D 6/26/2018 ---FR-145-MW01 6/26/2018 --FR-MWBP-09C 6/27/2018 ---FR-HFMW-46B 6/27/2018 --FR-100-MW01 6/29/2018 --FR-FTA-MW01 6/29/2018 ---FR-FRB-1-062918 6/29/2018 ---

# **Chain of Custody**

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3101 Wilson Blvd Suite 900

Arlington,	Virginia	22201
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# 42343/1945536/9618849-60

# Chain of Custody

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Arlington, Virginia 22201

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42343/1945536/9618849-60

# Chain of Custody

**AECOM** 

3101 Wilson Blvd Suite 900

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PAGE 1 OF 2 Phone No. (703) 682-4900; Fax No. (703) 682-4901 Chain of Custody No. Laboratory Project Name Analysis Eurofins Lancoster Lab
ddress

2425 New Holland Pike
lity State Zip
Lancoster PA PFC Phase 11 20180517-1 Point of Contact / Phone No. Batch May 16 Mike Myers (301) 820-3246 Site Contact/Pridne No. Zip Code MSAT. Glem Marte 17601 PFHXS PFHAA P FOS P FNA PFOA **ERPIMS Information** Other Sample Information Cooler SASamp No. of LOCID SBD SED Sample I.D. Date Matrix Time Comment Code No Con. No. Fresno FR-APR-5803-1 ی 2 5-18-18 1115 5-18-18 11120 FR-APR-5803-5 ک Fresno 2 Relinquished By/Company Del Cin 1. Received By / Company

Fed Fx \$ 191915188008 Time 32S Date 5.18.18 AFCOM 2. Relinquished By / Company Date 2. Received By / Company Time 3. Relinquished By / Company Date Time 3. Received By / Company Date Time 4. Received By / Company 4. Relinquished By / Company Date Time Date Time 5. Relinguished By / Company **Date** Time 5. Received By / Company Shipment Method/Airbill No. Comments

42343 1946800 9623953-80

## Chain of Custody

**AECOM** 

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Arlington, Virginia 22201 PAGE \ OF 3 Phone No. (703) 682-4900; Fax No. (703) 682-4901 Laboratory Proiect Name Chain of Custody No. Analysis Eurofins Loncoster Laboratory AFC Phase 11 20180522-1 Point of Contact / Phone No. Batch May 16 Mike Myers (301) 820-3246 2425 New Hollard Pike Site Contact / Phone No. Zip Code Msgt. Glenn Marte master PA 17601 FHX PFHOA B PFNA 82 ERPIMS Information Other Sample Information Cooler Samp No. of LOCID SBD SED Sample I.D. Matrix Date Time Comment Code Con. FR-FTA-5803-1 521-18 0930 5 Fresno FR- FTA-5803 - 5 15-21-18 0740 5 2 Fregro FR-FTA-5B02-1 8-21-18 Frans 1040 2 15-21-18 2 FR- FTA-5802-5 1050 2 Fresno 5-21-18 Fresno FR-FTA-SBUZ- 50 2 1050 5 FR- FTA-5807-1 5-21-18 Fregno 1153 7 2 FR- FTA-SKOI-S 5.21.18 1203 2 Fregro 5 FR-100-5801-1 5.21.18 1410 2 Freeno 5-21-10 1420 FR-100-5801-5 Fresmo FR-104-5802-1 Fresno 5-21-18 5 1440 2 5 FR-104-8802-5 1488 Fregno 5.21.18 2 FR-104-5801-1 8.21.18 1510 5 2 Fresso FR.104. 5801. 5 1520 5 Fregno 5.21.18 Daniel Correla Du La AECOM 1. Received By / Company PLACX 9 811915188019 / 81191 5188020 Date 5.22.19 Time 1500 Date 5:22.18 Time Relinguished By / Company 2. Received By / Company Time Date Time 3. Relinguished By / Company Date Time 3. Received By / Company Date Time 4. Relinguished By / Company Date Time 4. Received By / Company 5. Relinguished By / Company 5. Received By / Company 5P#3/8 7005 Date Time Shipment Method/Airbill No. Comments

42343 1946860 9623953-80

# Chain of Custody

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Arlington, Virginia 22201

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PAGE 2 OF 3

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PAGE 3 OF 3

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# **Chain of Custody**

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PAGE 1 OF 2

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## **Chain of Custody**

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3101 Wilson Blvd Suite 900 Arlington, Virginia 22201 Phone No. (703) 682-4900; Fax No. (703) 682-490

Phone No. (703) 682-4900; Fax No. (703) 682-4901 Project Name
Freque ANG PFC SI Chain of Custody No. Analysis Eurofing Lancaster-Address 2425 New Holland Pike Batch May 16 17601 23 ERPIMS Information Samp No. of Cooler LOCID SBD SED Sample I.D. Date Time Matrix Comment No Con. Code FR-0 F1-5001 0F2-5001 6/29/18 1148 MS/MSD 5 Neptone AECOLL Date 6/18 1. Relinquished By / Company 1. Received By / Company Date Time Time 1400 2. Relinquished By / Company 2. Received By / Company Date Time 3. Relinquished By / Company 3. Received By / Company Date Time 4. Received By-/ Company 4. Relinquished By / Company-Date Time -Time 5. Relinquished By / Company Date 5. Received By / Company Comments

#### **Data Qualifying Codes**

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic (January 2017) Data Review.

#### **Data Validation Flags**

Flag	Interpretation
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but not detected at a level greater than or equal to the level of the adjusted Detection Limit (DL) for sample and method.
J+	Inorganic analyte present. Reported value may not be accurate or precise, but the result may be biased high.
J-	Inorganic analyte present. Reported value may not be accurate or precise, but the result may be biased low.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the Limit of Detection (LOD).
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
UJ	The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.
С	This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by gas Chromatograph/Mass Spectrometer (GC/MS)
х	This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

#### **Reason Codes**

GC/MS Organics		GC and HPLC Organics			Inorganics and Conventionals				
Code	Interpretation	Code	Interpretation	Code	Interpretation				
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence				
b	Bubble found in vial >6mm	b	Instrument performance failure	b	Laboratory duplicate imprecision				
с	Calibration failure; poor or unstable response	c c	Calibration failure; poor or unstable response	С	Calibration failure				
d	MS/MSD imprecision	d	MS/MSD imprecision	d	MS/MSD imprecision				
e	LCSD imprecision	е	LCSD imprecision	е	LCSD imprecision				
f	Field duplicate imprecision	f	Field duplicate imprecision	f	Field duplicate imprecision				
g	Tuning failure or poor mass spec performance	g	Dual column confirmation imprecision	g	Duel isotope imprecision				
h	Holding time violation	h	Holding time violation	h	Holding time violation				
i .	Internal standard failure	i	Internal standard failure	k	Cooler receipt temperature exceeds limits				
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	1	LCS recovery failure				
1	LCS recovery failure	1	LCS recovery failure	m	MS/MSD recovery failure				
m	MS/MSD recovery failure	m	MS/MSD recovery failure	n	ICS failure				
p	Poor chromatography	p	Poor chromatography	0	Calibration blank contamination				
q	Concentration exceeded the linear range	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range				
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA				
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure				
t	TIC	t	Blender blank contamination	t	Carboy Lot detection				
w	Identification criteria failure	u	No confirmation column	u	BOD minimum depletion did not exceed 2mg/L				
х	Field blank contamination	w	Retention time failure	v	Post-digestion spike failure				
у	Trip blank contamination	х	Field blank contamination	w	CRDL Standard Failure				
z	Method blank contamination	z	Method blank contamination	х	Field blank contamination				
				z	Preparation/Method blank contamination				









#### **ANALYSIS REPORT**

Prepared by:

Prepared for:

Eurofins Lancaster Laboratories Environmental 2425 New Holland Pike Lancaster, PA 17601 AECOM Suite 150 12420 Milestone Center Drive Germantown MD 20876

Report Date: April 15, 2018 22:06

Project: Fresno Phase II

Account #: 42343 Group Number: 1926405 SDG: FSA84 PO Number: 93872 State of Sample Origin: AR

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at <a href="http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/">http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/</a>. To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To AECOM Electronic Copy To AECOM Electronic Copy To AECOM Attn: Todd Church Attn: Naoum Tavantzis Attn: Mike Myers

Respectfully Submitted,

Lay How

Kay Hower

(717) 556-7364









#### **SAMPLE INFORMATION**

**Client Sample Description** 

F-Source Water - 03.28.2018 Water

Sample Collection
Date/Time

ELLE#

03/28/2018 09:17

9536572

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.





Project Name: Fresno Phase II ELLE Group #: 1926405

#### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

#### **Analysis Specific Comments:**

#### EPA 537 mod QSM 5.1 table B-15, Misc. Organics

Sample #s: 9536572

The laboratory's DoD Scope of Accreditation does not include the following method: EPA 537 mod QSM 5.1 table B-15.



# Analysis Report

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Sample Description: F-Source Water - 03.28.2018 Water

Fresno PFC Phase II

**Project Name:** Fresno Phase II

Submittal Date/Time: 03/31/2018 09:55 Collection Date/Time: 03/28/2018 09:17

SDG#: FSA84-01 **AECOM** 

ELLE Sample #: WW 9536572 1926405

**ELLE Group #:** 

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF	
Misc. C	Organics	EPA 537 m table B-15	od QSM 5.1	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	е	375-73-5	4.1	0.29	0.98	0.98	1
14434	Perfluoroheptanoic acid		375-85-9	2.0	0.29	0.98	0.98	1
14434	Perfluorohexanesulfonat	te	355-46-4	9.5	0.39	2.0	2.0	1
14434	Perfluorononanoic acid		375-95-1	N.D.	0.39	2.0	2.0	1
14434	Perfluoro-octanesulfona	te	1763-23-1	6.3	0.59	2.0	2.0	1
14434	Perfluorooctanoic acid		335-67-1	3.2	0.29	0.98	0.98	1
	aboratory's DoD Scope of od: EPA 537 mod QSM 5.		es not include th	e following				

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record**

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18093009	04/12/2018 13:27	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18093009	04/03/2018 07:05	Pamela Rothharpt	1

<sup>\*=</sup>This limit was used in the evaluation of the final result

#### **Quality Control Summary**

Client Name: AECOM Group Number: 1926405

Reported: 04/15/2018 22:06

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/l	ng/l	ng/l	ng/l
Batch number: 18093009	Sample num	ber(s): 9536572	2	
Perfluorobutanesulfonate	N.D.	0.30	1.0	1.0
Perfluoroheptanoic acid	N.D.	0.30	1.0	1.0
Perfluorohexanesulfonate	N.D.	0.40	2.0	2.0
Perfluorononanoic acid	N.D.	0.40	2.0	2.0
Perfluoro-octanesulfonate	N.D.	0.60	2.0	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0	1.0

#### LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
D	•	•	iig/i	119/1					
Batch number: 18093009	Sample number(	(s): 9536572							
Perfluorobutanesulfonate	4.81	4.34	4.81	4.31	90	90	70-130	1	30
Perfluoroheptanoic acid	5.44	5.19	5.44	4.79	95	88	70-130	8	30
Perfluorohexanesulfonate	5.14	4.66	5.14	5.19	91	101	70-130	11	30
Perfluorononanoic acid	5.44	5.53	5.44	5.08	102	93	70-130	8	30
Perfluoro-octanesulfonate	5.20	4.58	5.20	4.40	88	85	70-130	4	30
Perfluorooctanoic acid	5 44	5 12	5 44	5 22	94	96	70-130	2	30

#### **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD

Batch number: 18093009

	13C3-F %Rec	PFBS LOD (ng/l)	13C3- %Rec	PFHxS LOD (ng/l)	13C4-F %Rec	PFHpA LOD (ng/l)	13C8-P %Rec	FOA LOD (ng/l)	13C8-F %Rec	PFOS LOD (ng/l)	13C9-F %Rec	PFNA LOD (ng/l)	
9536572	85	9.8	87	9.8	86	2.0	83	2.0	74	9.8	76	2.0	
Blank	69	10	70	10	73	2.0	70	2.0	73	10	69	2.0	
LCS	78	10	86	10	83	2.0	86	2.0	79	10	82	2.0	
LCSD	72	10	73	10	79	2.0	78	2.0	78	10	83	2.0	

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.



# Analysis Report

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#### **Quality Control Summary**

Client Name: AECOM Group Number: 1926405

Reported: 04/15/2018 22:06

#### **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD

Batch number: 18093009

Limits: 50-150 50-150 50-150 50-150 50-150 50-150

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

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Phone No. (703) 682	4900;	Fax N	lo. (703)	682-49	001 423	43 _ / Project Name	9264	105/	953	365	72											PAGE _	_ of <u>1</u>
Laboratory	-					Project Name						Analysis									Chain of Custody No.		
Eurofins Lanc	aste	r Lal	borat	ory		PFC Phase II					(S)		txS)		(i)								
Address						Point of Conta	ct / Phone No	).	***************************************			1	PFO	₹ ¥	(PF	(A)	PFB				Batch May	16	
2425 New Holland Pike				Mike My	ers (301	) 820-3	246			(PFOA)	acid (	I (PFI	sulfonic acid (PFHxS)	(PFH <sub>I</sub>	acid (								
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LOCID	SBD	SED	SA Code	Samp No	Samp	le I.D.	Date	Time	Matrix	No. of Con.	Cooler No.	Perfluor	Perfluorooctanesulfonic acid (PFOS)	Perfluorononanoic acid (PFNA)	Perfluorohexane	Perfluoroheptanoic acid (PFHpA)	Perfluorobutanesulfonic acid (PFBS)				Comment		
Fresno					F-Source Wate	r - 03.28.2018	3/28/2018	0917	W	2	ì	X	X	$\times$	X	×	X	_					
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2. Relinguished By / LILL Relinguished By /	Comp	any M/L	77		8217 43	40	Date	Time	2. Rec	eived By	/ Compa	ny			eranno de de	··-	-	Water Street				Date	Time
3. Relinquished By /	Comp	any-		•			Date	Time	3. Rec	eived-By	/-Gompa	ny			1000	***********						Date	Time
4. Relinquished By /	Comp	any		The second second		4	Date	Time	4. Rec	eived-By	-/-Compa	ny					-					Date	Time
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Comments Source water sampl	e for F	resno	ANGB							,								Ship	men	t Met	thod/Airbill I	lo.	,



#### Sample Administration Receipt Documentation Log

Doc Log ID: 212529 

Group Number(s): 1926405

Client: Aecom

**Delivery and Receipt Information** 

Delivery Method: Fed Ex Arrival Timestamp: 03/31/2018 9:55

Number of Packages: Number of Projects: <u>1</u> <u>1</u>

State/Province of Origin: VA

**Arrival Condition Summary** 

Shipping Container Sealed: Yes Sample IDs on COC match Containers: Yes

**Custody Seal Present:** Yes Sample Date/Times match COC: Yes

**Custody Seal Intact:** Yes VOA Vial Headspace ≥ 6mm: N/A

0 Samples Chilled: Yes Total Trip Blank Qty:

Paperwork Enclosed: Air Quality Samples Present: No Yes

Samples Intact: Yes

Missing Samples: No

Extra Samples: No

Discrepancy in Container Qty on COC: No

Unpacked by Felix Gonzalez (13783) at 12:47 on 03/31/2018

#### **Samples Chilled Details**

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler# Thermometer ID Corrected Temp Therm. Type Ice Type Ice Present? Ice Container **Elevated Temp?** DT42-01 DT Wet Ν 1 1.0 Bagged

Page 1 of 1



### **Explanation of Symbols and Abbreviations**

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	mg	milligram(s)					
С	degrees Celsius	mL	milliliter(s)					
cfu	colony forming units	MPN	Most Probable Number					
CP Units	cobalt-chloroplatinate units	N.D.	non-detect					
F	degrees Fahrenheit	ng	nanogram(s)					
g	gram(s)	NTU	nephelometric turbidity units					
IU	International Units	pg/L	picogram/liter					
kg	kilogram(s)	RL	Reporting Limit					
L	liter(s)	TNTC	Too Numerous To Count					
lb.	pound(s)	μg	microgram(s)					
m3	cubic meter(s)	μL	microliter(s)					
meq	milliequivalents	umhos/cm	micromhos/cm					
<	less than							
>	greater than							
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.							
ppb	parts per billion							
Dry weight basis			oisture content. This increases the analyte weight ample without moisture. All other results are reported on an					

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

as-received basis.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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# **Data Qualifiers**

Qualifier	Definition
С	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
Р	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised
	due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.









### **ANALYSIS REPORT**

Prepared by:

Prepared for:

Eurofins Lancaster Laboratories Environmental 2425 New Holland Pike Lancaster, PA 17601 AECOM Suite 150 12420 Milestone Center Drive Germantown MD 20876

Report Date: June 06, 2018 15:53

Project: Fresno Phase II

Account #: 42343 Group Number: 1945536 SDG: FSB08 PO Number: 93872 State of Sample Origin: AR

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at <a href="http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/">http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/</a>. To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To AECOM Electronic Copy To AECOM Electronic Copy To AECOM Attn: Todd Church Attn: Naoum Tavantzis Attn: Mike Myers

Respectfully Submitted,

Lay How

Kay Hower

(717) 556-7364









### **SAMPLE INFORMATION**

Client Sample Description	Sample Collection	ELLE#
	<u>Date/Time</u>	
FR-EB-051618 Water	05/16/2018 13:25	9618849
FR-145-SB03-1 Soil	05/16/2018 15:40	9618850
FR-145-SB03-5 Soil	05/16/2018 16:00	9618851
FR-145-SB01-1 Soil	05/17/2018 13:15	9618852
FR-145-SB01-5 Soil	05/17/2018 13:26	9618853
FR-APR-SB01-1 Soil	05/17/2018 15:05	9618854
FR-APR-SB01-5 Soil	05/17/2018 15:40	9618855
FR-APR-SB01-5D Soil	05/17/2018 15:40	9618856
FR-FRB-051718 Water	05/17/2018 16:55	9618857
FR-APR-SB03-1 Soil	05/18/2018 11:15	9618859
FR-APR-SB03-5 Soil	05/18/2018 11:20	9618860

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.





Project Name: Fresno Phase II ELLE Group #: 1945536

### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

### **Analysis Specific Comments:**

### EPA 537 mod QSM 5.1 table B-15, LC/MS/MS Miscellaneous

Sample #s: 9618852, 9618854

The following analytes were manually integrated due to incorrect integrations: Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9618856

The following analytes were manually integrated due to incorrect integrations: Perfluoronanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9618853

The following analytes were manually integrated due to incorrect integrations: Perfluoronanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9618860

The following analytes were manually integrated due to incorrect integrations: Perfluoro-octanesulfonate

Sample #s: 9618850

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9618851

The following analytes were manually integrated due to incorrect integrations:



## Case Narrative

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Perfluorooctanoic acid, Perfluorononanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

### Sample #s: 9618855, 9618859

The following analytes were manually integrated due to incorrect integrations:

Perfluorooctanoic acid, Perfluorononanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

### Batch #: 18141012 (Sample number(s): 9618849, 9618857 UNSPK: P617470)

The recovery(ies) for the following analyte(s) in the LCS exceeded the acceptance window indicating a positive bias: Perfluorooctanoic acid, Perfluoroheptanoic acid

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorononanoic acid

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) MS, MSD

### Batch #: 18141016 (Sample number(s): 9618850-9618856, 9618859-9618860 UNSPK: P617478)

The recovery(ies) for the following analyte(s) in the MS exceeded the acceptance window indicating a positive bias: Perfluorooctanoic acid, Perfluorononanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

### SM 2540 G-1997 %Moisture Calc, Wet Chemistry

### Batch #: 18142820005A (Sample number(s): 9618850 BKG: 9618850)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture

### Batch #: 18142820005B (Sample number(s): 9618851-9618856, 9618859-9618860 BKG: 9618856)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture



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Sample Description: FR-EB-051618 Water

PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00
Collection Date/Time: 05/16/2018 13:25
SDG#: FSB08-01EB

**AECOM** 

ELLE Sample #: WW 9618849

ELLE Group #: 1945536

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/	MS Miscellaneous EPA 537 m table B-15	od QSM 5.1	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.28	1.0	1.9	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.28	1.1	1.9	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.38	1.0	1.9	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.38	1.1	1.9	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.56	2.2	2.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.28	1.1	1.9	1

### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record**

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141012	05/30/2018 03:13	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141012	05/21/2018 09:30	Robert Brown	1



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Sample Description: FR-145-SB03-1 Soil

**PFC Phase II** 

Project Name: Fresno Phase II

SDG#: FSB08-02

**AECOM** 

ELLE Sample #: SW 9618850 ELLE Group #: 1945536

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.48 J	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	1.2	0.21	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	3.4	0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	0.67 J	0.21	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	84	0.21	0.67	0.82	1
14478	Perfluorooctanoic acid	335-67-1	0.43 J	0.21	0.70	0.82	1
Wet CI		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	2.5	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

### Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time **Factor** No. EPA 537 mod QSM 5.1 05/31/2018 02:34 14478 PFAS in Soil by LC/MS/MS-DoD 1 18141016 Marissa C Drexinger table B-15 PFAS Solid Prep - DoD Anthony C Polaski EPA 537 mod QSM 5.1 18141016 05/21/2018 18:00 1 14510 table B-15 SM 2540 G-1997 18142820005A 05/22/2018 17:11 Scott W Freisher 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



SW 9618851

1945536

**AECOM** 

**ELLE Sample #:** 

**ELLE Group #:** 

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Sample Description: FR-145-SB03-5 Soil

**PFC Phase II** 

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00 Collection Date/Time: 05/16/2018 16:00

SDG#: FSB08-03

Fresno Phase II	Matrix: Soil
05/19/2018 10:00	
05/40/0040 40 00	

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table E		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.4	0.20	0.59	0.78	1
14478	Perfluoroheptanoic acid	375-85-9	0.37 J	0.20	0.67	0.78	1
14478	Perfluorohexanesulfonate	355-46-4	9.8	0.20	0.63	0.78	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.67	0.78	1
14478	Perfluoro-octanesulfonate	1763-23-1	25	0.20	0.64	0.78	1
14478	Perfluorooctanoic acid	335-67-1	0.64 J	0.20	0.67	0.78	1
Wet Ch		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	2.7	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

### Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time **Factor** No. 14478 EPA 537 mod QSM 5.1 PFAS in Soil by LC/MS/MS-DoD 1 18141016 05/31/2018 02:49 Marissa C Drexinger table B-15 PFAS Solid Prep - DoD Anthony C Polaski EPA 537 mod QSM 5.1 18141016 05/21/2018 18:00 1 14510 table B-15 SM 2540 G-1997 18142820005B 05/22/2018 17:11 Scott W Freisher 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



SW 9618852

1945536

**AECOM** 

**ELLE Sample #:** 

**ELLE Group #:** 

Matrix: Soil

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Sample Description: FR-145-SB01-1 Soil

**PFC Phase II** 

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00 
Collection Date/Time: 05/17/2018 13:15

SDG#: FSB08-04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table l		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.0	0.20	0.61	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	0.70 J	0.20	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	8.6	0.20	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	0.26 J	0.20	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	24	0.20	0.67	0.82	1
14478	Perfluorooctanoic acid	335-67-1	0.71 J	0.20	0.70	0.82	1
Wet Cl		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	3.3	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time **Factor** No. EPA 537 mod QSM 5.1 05/31/2018 03:05 14478 PFAS in Soil by LC/MS/MS-DoD 1 18141016 Marissa C Drexinger table B-15 PFAS Solid Prep - DoD Anthony C Polaski EPA 537 mod QSM 5.1 18141016 05/21/2018 18:00 1 14510 table B-15 SM 2540 G-1997 18142820005B 05/22/2018 17:11 Scott W Freisher 00111 Moisture %Moisture Calc



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Sample Description: FR-145-SB01-5 Soil

**PFC Phase II** 

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00 Collection Date/Time: 05/17/2018 13:26

SDG#: FSB08-05

Α	EC	0	М

ELLE Sample #: SW 9618853 ELLE Group #: 1945536

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.48 J	0.20	0.61	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	3.5	0.20	0.65	0.82	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	15	0.20	0.66	0.82	1
14478	Perfluorooctanoic acid	335-67-1	0.34 J	0.20	0.69	0.82	1
Wet CI		540 G-1997 isture Calc	%	%	%	%	
00111	Moisture	n.a.	4.7	0.50	0.50	0.50	1
	Moisture represents the loss in v 103 - 105 degrees Celsius. The as-received basis.						

### Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time **Factor** No. 14478 EPA 537 mod QSM 5.1 PFAS in Soil by LC/MS/MS-DoD 1 18141016 05/31/2018 03:20 Marissa C Drexinger table B-15 PFAS Solid Prep - DoD Anthony C Polaski EPA 537 mod QSM 5.1 18141016 05/21/2018 18:00 1 14510 table B-15 SM 2540 G-1997 18142820005B 05/22/2018 17:11 Scott W Freisher 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB01-1 Soil

PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00 Collection Date/Time: 05/17/2018 15:05

SDG#: FSB08-06

**AECOM** 

ELLE Sample #: SW 9618854 ELLE Group #: 1945536

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA table		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.31 J	0.19	0.57	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	0.85	0.19	0.65	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	2.4	0.19	0.61	0.77	1
14478	Perfluorononanoic acid	375-95-1	0.71 J	0.19	0.65	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	46	0.19	0.62	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.69 J	0.19	0.65	0.77	1
Wet Cl		540 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	3.2	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.	•	, ,				

### Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time No. **Factor** 14478 EPA 537 mod QSM 5.1 PFAS in Soil by LC/MS/MS-DoD 1 18141016 05/31/2018 03:52 Marissa C Drexinger table B-15 PFAS Solid Prep - DoD Anthony C Polaski EPA 537 mod QSM 5.1 18141016 05/21/2018 18:00 1 14510 table B-15 SM 2540 G-1997 18142820005B 05/22/2018 17:11 Scott W Freisher 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB01-5 Soil

**PFC Phase II** 

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00 Collection Date/Time: 05/17/2018 15:40

SDG#: FSB08-07

ELLE Sample #: SW 9618855 ELLE Group #: 1945536

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.40 J	0.19	0.57	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	0.22 J	0.19	0.65	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	2.7	0.19	0.61	0.77	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.65	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	6.4	0.19	0.62	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.20 J	0.19	0.65	0.77	1
Wet Cl		540 G-1997 isture Calc	%	%	%	%	
00111	Moisture	n.a.	3.3	0.50	0.50	0.50	1
	Moisture represents the loss in v 103 - 105 degrees Celsius. The as-received basis.						

### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time **Factor** No. 14478 EPA 537 mod QSM 5.1 PFAS in Soil by LC/MS/MS-DoD 1 18141016 05/31/2018 04:07 Marissa C Drexinger table B-15 PFAS Solid Prep - DoD Anthony C Polaski EPA 537 mod QSM 5.1 18141016 05/21/2018 18:00 1 14510 table B-15 SM 2540 G-1997 18142820005B 05/22/2018 17:11 Scott W Freisher 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB01-5D Soil

**PFC Phase II** 

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00 Collection Date/Time: 05/17/2018 15:40

SDG#: FSB08-08

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ELLE Sample #: SW 9618856 ELLE Group #: 1945536

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table i	· · · · · · · · · · · · · · · · · · ·	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.61 J	0.19	0.58	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	0.34 J	0.19	0.66	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	5.2	0.19	0.62	0.77	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.66	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	12	0.19	0.63	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.38 J	0.19	0.66	0.77	1
Wet CI		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	3.3	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time No. **Factor** 14478 EPA 537 mod QSM 5.1 PFAS in Soil by LC/MS/MS-DoD 1 18141016 05/31/2018 04:23 Marissa C Drexinger table B-15 PFAS Solid Prep - DoD Anthony C Polaski EPA 537 mod QSM 5.1 18141016 05/21/2018 18:00 1 14510 table B-15 SM 2540 G-1997 18142820005B 05/22/2018 17:11 Scott W Freisher 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-FRB-051718 Water

**PFC Phase II** 

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00
Collection Date/Time: 05/17/2018 16:55
SDG#: FSB08-09FB

Perfluorooctanoic acid

14434

**AECOM** 

ELLE Sample #: WW 9618857 ELLE Group #: 1945536

ELLE Group #: 1949 Matrix: Water

1.8

1

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 53		ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	1.0	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.27	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	1.0	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.54	2.1	2.7	1

### **Sample Comments**

0.27

1.1

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

335-67-1

N.D.

### **Laboratory Sample Analysis Record**

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141012	05/30/2018 03:28	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141012	05/21/2018 09:30	Robert Brown	1



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Sample Description: FR-APR-SB03-1 Soil

PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00 Collection Date/Time: 05/18/2018 11:15

SDG#: FSB08-11

**AECOM** 

ELLE Sample #: SW 9618859 ELLE Group #: 1945536

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	N.D.	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	2.9	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.20	0.69	0.81	1
Wet CI		640 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	2.5	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time **Factor** No. 05/31/2018 04:38 14478 EPA 537 mod QSM 5.1 PFAS in Soil by LC/MS/MS-DoD 1 18141016 Marissa C Drexinger table B-15 PFAS Solid Prep - DoD Anthony C Polaski EPA 537 mod QSM 5.1 18141016 05/21/2018 18:00 1 14510 table B-15 SM 2540 G-1997 18142820005B 05/22/2018 17:11 Scott W Freisher 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB03-5 Soil

**PFC Phase II** 

Project Name: Fresno Phase II

Submittal Date/Time: 05/19/2018 10:00 Collection Date/Time: 05/18/2018 11:20

SDG#: FSB08-12

**AECOM** 

ELLE Sample #: SW 9618860 ELLE Group #: 1945536

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 53		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.62	0.83	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.21	0.71	0.83	1
14478	Perfluorohexanesulfonate	355-46-4	N.D.	0.21	0.67	0.83	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.71	0.83	1
14478	Perfluoro-octanesulfonate	1763-23-1	0.94	0.21	0.68	0.83	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.21	0.71	0.83	1
Wet CI		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	3.9	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

### Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/31/2018 04:54	Marissa C Drexinger	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18141016	05/21/2018 18:00	Anthony C Polaski	1				
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18142820005B	05/22/2018 17:11	Scott W Freisher	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result

## **Quality Control Summary**

Client Name: AECOM Group Number: 1945536

Reported: 06/06/2018 15:53

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/g	ng/g	ng/g	ng/g
Batch number: 18141016	Sample num	ber(s): 9618850	0-9618856,96	18859-9618860
Perfluorobutanesulfonate	N.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80
	ng/l	ng/l	ng/l	ng/l
Batch number: 18141012	Sample num	ber(s): 9618849	9,9618857	
Perfluorobutanesulfonate	N.D.	0.30	1.1	2.0
Perfluoroheptanoic acid	N.D.	0.30	1.2	2.0
Perfluorohexanesulfonate	N.D.	0.40	1.1	2.0
Perfluorononanoic acid	N.D.	0.40	1.2	2.0
Perfluoro-octanesulfonate	N.D.	0.60	2.3	3.0
Perfluorooctanoic acid	N.D.	0.30	1.2	2.0

### LCS/LCSD

Analysis Name	LCS Spike Added ng/g	LCS Conc ng/g	LCSD Spike Added ng/g	LCSD Conc ng/g	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18141016	Sample number(	s): 9618850-9	9618856,9618859-9	618860					
Perfluorobutanesulfonate	1.20	1.13	1.20	1.23	94	103	70-130	8	30
Perfluoroheptanoic acid	1.36	1.57	1.36	1.58	115	116	70-130	1	30
Perfluorohexanesulfonate	1.29	1.18	1.29	1.29	92	101	70-130	9	30
Perfluorononanoic acid	1.36	1.48	1.36	1.49	108	109	70-130	1	30
Perfluoro-octanesulfonate	1.30	1.18	1.30	1.34	91	103	70-130	12	30
Perfluorooctanoic acid	1.36	1.52	1.36	1.37	112	101	70-130	10	30
	ng/l	ng/l	ng/l	ng/l					
Batch number: 18141012	Sample number(	s): 9618849,9	9618857						
Perfluorobutanesulfonate	4.81	5.93			123		70-130		
Perfluoroheptanoic acid	5.44	7.22			133*		70-130		
Perfluorohexanesulfonate	5.14	5.86			114		70-130		
Perfluorononanoic acid	5.44	6.96			128		70-130		
Perfluoro-octanesulfonate	5.20	5.73			110		70-130		

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

## **Quality Control Summary**

Client Name: AECOM Group Number: 1945536

Reported: 06/06/2018 15:53

## LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorooctanoic acid	5.44	7.26			133*		70-130		
	%	%	%	%					
Batch number: 18142820005A	Sample number(	s): 9618850							
Moisture	89.5	89.43			100		99-101		
Batch number: 18142820005B	Sample number(	s): 9618851-9	618856,9618859-9	618860					
Moisture	89.5	89.43			100		99-101		

### MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/g	MS Spike Added ng/g	MS Conc ng/g	MSD Spike Added ng/g	MSD Conc ng/g	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 18141016	Sample number	er(s): 9618850-	9618856,9	618859-9618860	UNSPK: I	P617478				
Perfluorobutanesulfonate	0.264	1.19	1.59			111		70-130		
Perfluoroheptanoic acid	0.682	1.35	2.63			145*		70-130		
Perfluorohexanesulfonate	5.10	1.27	7.62			198 (2)		70-130		
Perfluorononanoic acid	1.87	1.35	3.82			145*		70-130		
Perfluoro-octanesulfonate	135.49	1.29	167.14			2459 (2)		70-130		
Perfluorooctanoic acid	3.00	1.35	5.16			160*		70-130		
	ng/l	ng/l	ng/l	ng/l	ng/l					
Batch number: 18141012	Sample number	er(s): 9618849,	9618857 U	NSPK: P617470						
Perfluorobutanesulfonate	0.755	4.21	5.59	4.19	5.30	115	108	70-130	5	30
Perfluoroheptanoic acid	N.D.	4.75	5.78	4.74	6.14	122	130	70-130	6	30
Perfluorohexanesulfonate	0.905	4.50	5.56	4.48	5.75	104	108	70-130	3	30
Perfluorononanoic acid	0.490	4.75	5.82	4.74	6.70	112	131*	70-130	14	30
Perfluoro-octanesulfonate	N.D.	4.54	5.33	4.53	5.64	117	125	70-130	6	30
Perfluorooctanoic acid	0.542	4.75	6.12	4.74	6.61	117	128	70-130	8	30

## **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max
	%	%		

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

## **Quality Control Summary**

Client Name: AECOM Group Number: 1945536

Reported: 06/06/2018 15:53

### **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	<b>DUP Conc</b>	DUP RPD	DUP RPD Max
	%	%		
Batch number: 18142820005A	Sample number(s): 9618	850 BKG: 9618850		
Moisture	2.51	2.30	9* (1)	5
Batch number: 18142820005B	Sample number(s): 9618	851-9618856,9618859-	9618860 BKG: 9	618856
Moisture	3.31	3.10	7*	5

### **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD

Batch number: 18141012

	13C3-F	PFBS	13C3-F	PFHxS	13C4-F	PFHpA	13C8-F	PFOA	13C8-F	FOS	13C9-F	PFNA	
	%Rec	LOD	%Rec	LOD	%Rec	LÓD	%Rec	LOD	%Rec	LOD	%Rec	LOD	
		(ng/l)											
9618849	90	9.4	96	9.4	90	1.9	95	1.9	94	9.4	119	1.9	
9618857	86	9.1	84	9.1	84	1.8	88	1.8	92	9.1	103	1.8	
Blank	90	10	95	10	89	2.0	96	2.0	95	10	123	2.0	
LCS	91	10	99	10	97	2.0	98	2.0	100	10	125	2.0	
MS	194*	8.7	91	8.7	93	1.7	92	1.7	94	8.7	113	1.7	
MSD	222*	8.7	96	8.7	94	1.7	92	1.7	96	8.7	111	1.7	
Limits:	50-15	0	50-15	0	50-15	0	50-15	0	50-15	0	50-15	0	

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18141016

	13C3-F	PFBS	13C3-F	PFHxS	13C4-F	PFHpA	13C8-F	PFOA	13C8-F	PFOS	13C9-F	PFNA
	%Rec	LOD (ng/g)	%Rec	LOD (ng/g)	%Rec	LÖD (ng/g)	%Rec	LOD (ng/g)	%Rec	LOD (ng/g)	%Rec	LOD (ng/g)
9618850	54	1.2	58	1.2	59	1.2	62	1.2	60	1.8	70	0.80
9618851	56	0.57	66	0.57	64	0.57	62	0.57	69	0.86	75	0.38
9618852	61	0.59	73	0.59	69	0.59	68	0.59	71	0.89	79	0.40
9618853	64	0.58	75	0.58	69	0.58	74	0.58	73	0.87	78	0.39
9618854	65	0.56	77	0.56	71	0.56	74	0.56	77	0.83	90	0.37
9618855	65	0.56	79	0.56	76	0.56	78	0.56	78	0.83	93	0.37
9618856	65	0.56	80	0.56	77	0.56	73	0.56	73	0.84	78	0.37
9618859	53	0.59	63	0.59	60	0.59	60	0.59	60	0.89	73	0.40
9618860	63	1.2	78	1.2	76	1.2	71	1.2	67	1.8	81	0.80
Blank	59	1.2	73	1.2	67	1.2	68	1.2	72	1.8	81	0.80
LCS	68	1.2	80	1.2	74	1.2	76	1.2	79	1.8	94	0.80
LCSD	60	1.2	71	1.2	71	1.2	72	1.2	69	1.8	79	0.80

<sup>\*-</sup> Outside of specification

P##### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.



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## **Quality Control Summary**

Client Name: AECOM Group Number: 1945536

Reported: 06/06/2018 15:53

## **Surrogate Quality Control (continued)**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18141016

Daton nam							
	13C3-PFBS	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS	13C9-PFNA	
	%Rec LOD	%Rec LOD	%Rec LOD	%Rec LOD	%Rec LOD	%Rec LOD	
	(ng/g)	(ng/g)	(ng/g)	(ng/g)	(ng/g)	(ng/g)	
MS	62 0.59	75 0.59	72 0.59	72 0.59	75 0.89	85 0.40	
Limits:	50-150	50-150	50-150	50-150	50-150	50-150	

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

# 12343/1945536/9618849-60

## Chain of Custody

AECOM

3101 Wilson Blvd Suite 900

Arlington, Virginia 22201

**AECOM** 

PAGE | OF 2 Phone No. (703) 682-4900; Fax No. (703) 682-4901 Laboratory Project Name Chain of Custody No. Analysis PFC Phase 11 Eurofins Lancoster Laboratory 20180517-1 Point of Contact / Phone No. Address Batch May 16 2425 New Holland Pike Mike Myers (301) 820-3246 Site Contact / Phone No. City Msgt. Glenn Marte lancaster 17601 PA 5 A N PFHX PFNA P FOS **ERPIMS Information** Other Sample Information PFH 3 Cooler SA Samp No. of 4 LOCID Sample I.D. SBD Matrix SED Date Time Comment 0 Code No Con. No. X Fresno FR- EB-051618 X 5.16-18 1325 W X 1355 FR APR SBOS-1 5-16-18 FR APR 5805-5 5-16-18 1440 2 5 5-16-18 Fresno FR-145-5803-1 1540 5 2 S FR-145-5803-5 2 5.16.18 × Fresno 1600 5-17-18 S 2 FR-145-5801-1 1315 X flesno 5 X FR-145-5801-5 5-17-18 1326 2 Fresno X FR - APR - SROI - 1 5-17-18 1505 5 2 Tresno FR. APR-5801-5 5-17-18 1540 5 2 X × Fresno X FR-APR-5801-5D 2 5-17-18 5 Fresnd 1540 × × × × 5 17 18 1550 FR-APR- 5801 5802 5 7 DC 5-17-18 1655 W Fresno FR-FRB-051718 X × X Fresno FR-145-5802-1 5.17.18 1550 2 Belinguished By / Compan Did Ca 1. Reseived By / Company FRACK D: 811915188008 5.18.18 Time 1325 3.18.18 Time 1325 AFROM 2. Relinquished By / Company Date 2. Received By / Company Time Time 3. Relinquished By / Company Date Time 3. Received By / Company Date Time 4. Relinquished By / Company 4. Received By / Company Date Time Date Time 5. Relinquished By / Company 5. Received By / Company Date Time Timeco Shipment Method/Airbill No. Comments

## Chain of Custody

AECOM

3101 Wilson Blvd Suite 900

Arlington, Virginia 22201

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PAGE 2 OF 2 Phone No. (703) 682-4900; Fax No. (703) 682-4901 Chain of Custody No. Laboratory Project Name Analysis Eurofins Lancoster Lab Iddress 2428 New Holland Pike 20180517-1 PFC Phase 11 Point of Contact / Phone No. Batch May 16 Mike Myers (301) 920-3246 Site Contact / Prione No. Zip Code 17601 Mgt. Wen Morte PFHXS PFHOA PFBS PENA **ERPIMS Information** Other Sample Information PFOS PFO Samp No. of Cooler LOCID SBD SED Sample I.D. Date Time Matrix Comment Code No Con. No. FR-APR-5803-1 2 1115 5 Fresno 5-18-18 H121120 5.18.18 Fresno FR-APR-5803-5 2 2 V Relinquished By/Company Der Cie 1. Received By / Company
Frace A: 811915188008 S-18-18 S.14.18 AECOM 2. Relinquished By / Company 2. Received By / Company Time Date Time Date 3. Relinquished By / Company Date Time 3. Received By / Company Date Time Date 4. Relinquished By / Company Time 4. Received By / Company Time 5. Received By / Company 5. Relinquished By / Company Time Date Comments Shipment Method/Airbill No.

# 1945536

## Kay Hower

From:

Tavantzis, Naoum < naoum.tavantzis@aecom.com>

Sent:

Tuesday, May 22, 2018 7:21 AM

To:

Kay Hower

Subject:

FW: AECOM: Fresno ANGB - do not analyze FR-144-SB02-1 from COC 20180518-1

### **EXTERNAL EMAIL\***

Please do not analyze the sample mentioned below

### Naoum Tavantzis

Project Chemist, Design & Consulting Services, DC Metro Area+ Chemistry Team Leader/ Practice Area Leader Geoenvironmental and Remediation Group D+1-919-461-1178 C+1-301-267-8761 naoum.layantzis@aecom.com

### AECOM

1600 Perimeter Park Drive, Suite 400, Morrisville, North Carolina 27560 T 919-461-1100 F 919-461-1415 www.aecom.com

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From: Correia, Daniel

Sent: Monday, May 21, 2018 11:28 PM

To: Tavantzis, Naoum Cc: Cardenas, Megan E

Subject: AECOM: Fresno ANGB - do not analyze FR-144-SB02-1 from COC 20180518-1

### Hello Naoum,

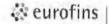
I shipped a cooler of soil samples to your lab on Friday. I would like to follow-up on that sample shipment, and request that sample FR-145-SB02-1 not be analyzed. We had to move the sample location due to refusal at depth, and I've resampled the shallower soil for this location. The new sample will be in the cooler that will likely be shipped tomorrow, however, please do not analyze FR-145-SB02-1 from COC 20180518-1.

Thanks,

### **Daniel Correia**

Geologist – Remediation Practice D 1-805-692-0671 C 1-805-245-9079 daniel.correja@aecom.com

**AECOM** 



**Environmental** 

## Sample Administration Receipt Documentation Log

Doc Log ID: 216931 

Group Number(s): 1945536

Client: AECOM

**Delivery and Receipt Information** 

Delivery Method:

Fed Ex

Arrival Timestamp:

05/19/2018 10:00

Number of Packages:

1

Number of Projects:

1

State/Province of Origin: VA

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

Custody Seal Present:

Yes

Sample Date/Times match COC:

Yes

Custody Seal Intact:

Yes

VOA Vial Headspace ≥ 6mm:

N/A

Samples Chilled:

Yes

Total Trip Blank Qty:

Paperwork Enclosed:

Yes Yes Air Quality Samples Present:

No

Samples Intact: Missing Samples:

No

Extra Samples:

No

Discrepancy in Container Qty on COC:

No

Unpacked by Simon Nies (25112) at 13:58 on 05/19/2018

Samples Chilled Details

Thermometer Types:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C

Thermometer ID

DT42-02

Corrected Temp 1.2

Therm. Type

Ice Type

Ice Present?

Ice Container

Elevated Temp?

DT

Wet

Bagged



## **Explanation of Symbols and Abbreviations**

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	mg	milligram(s)
С	degrees Celsius	mL	milliliter(s)
cfu	colony forming units	MPN	Most Probable Number
<b>CP Units</b>	cobalt-chloroplatinate units	N.D.	non-detect
F	degrees Fahrenheit	ng	nanogram(s)
g	gram(s)	NTU	nephelometric turbidity units
IU	International Units	pg/L	picogram/liter
kg	kilogram(s)	RL	Reporting Limit
L	liter(s)	TNTC	Too Numerous To Count
lb.	pound(s)	μg	microgram(s)
m3	cubic meter(s)	μL	microliter(s)
meq	milliequivalents	umhos/cm	micromhos/cm
<	less than		
>	greater than		
ppm		be equivalent to milli	kilogram (mg/kg) or one gram per million grams. For grams per liter (mg/l), because one liter of water has a weight uivalent to one microliter per liter of gas.
ppb	parts per billion		
Dry weight basis			oisture content. This increases the analyte weight ample without moisture. All other results are reported on an

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.



## **Data Qualifiers**

Qualifier	Definition
С	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
Р	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised
	due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.









### **ANALYSIS REPORT**

Prepared by:

Prepared for:

Eurofins Lancaster Laboratories Environmental 2425 New Holland Pike Lancaster, PA 17601 AECOM Suite 150 12420 Milestone Center Drive Germantown MD 20876

Report Date: June 08, 2018 13:45

Project: Fresno Phase II

Account #: 42343 Group Number: 1946800 SDG: FSB10 PO Number: 93872 State of Sample Origin: CA

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at <a href="http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/">http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/</a>. To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To AECOM Electronic Copy To AECOM Electronic Copy To AECOM Attn: Todd Church Attn: Naoum Tavantzis Attn: Mike Myers

Respectfully Submitted,

Lay How

Kay Hower

(717) 556-7364









### **SAMPLE INFORMATION**

Client Sample Description	Sample Collection	ELLE#
	<u>Date/Time</u>	
FR-FTA-SB03-1 Soil	05/21/2018 09:30	9623953
FR-FTA-SB03-5 Soil	05/21/2018 09:40	9623954
FR-FTA-SB02-1 Soil	05/21/2018 10:40	9623955
FR-FTA-SB02-5 Soil	05/21/2018 10:50	9623956
FR-FTA-SB02-5D Soil	05/21/2018 10:50	9623957
FR-FTA-SB01-1 Soil	05/21/2018 11:53	9623958
FR-FTA-SB01-5 Soil	05/21/2018 12:03	9623959
FR-100-SB01-1 Soil	05/21/2018 14:10	9623960
FR-100-SB01-5 Soil	05/21/2018 14:20	9623961
FR-104-SB02-1 Soil	05/21/2018 14:40	9623962
FR-104-SB02-5 Soil	05/21/2018 14:58	9623963
FR-104-SB01-1 Soil	05/21/2018 15:10	9623964
FR-104-SB01-5 Soil	05/21/2018 15:20	9623965
FR-145-SB02-1 Soil	05/21/2018 16:00	9623966
FR-145-SB02-5 Soil	05/21/2018 16:15	9623967
FR-100-SB01-5D Soil	05/21/2018 14:20	9623968
FR-APR-SB02-1 Soil	05/22/2018 07:47	9623969
FR-APR-SB02-5 Soil	05/22/2018 07:58	9623970
FR-APR-SB04-1 Soil	05/22/2018 08:56	9623971
FR-APR-SB04-1 MS Soil	05/22/2018 08:56	9623972
FR-APR-SB04-1 MSD Soil	05/22/2018 08:56	9623973
FR-APR-SB04-5 Soil	05/22/2018 09:04	9623974
FR-APR-SB05-1 Soil	05/22/2018 09:40	9623975
FR-APR-SB05-5 Soil	05/22/2018 11:00	9623976
FR-157-SB02-1 Soil	05/22/2018 11:12	9623977
FR-157-SB02-1D Soil	05/22/2018 11:12	9623978
FR-157-SB01-1 Soil	05/22/2018 11:47	9623979
FR-157-SB01-5 Soil	05/22/2018 11:54	9623980

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.





Project Name: Fresno Phase II ELLE Group #: 1946800

### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

### **Analysis Specific Comments:**

### EPA 537 mod QSM 5.1 table B-15, LC/MS/MS Miscellaneous

Sample #s: 9623954

The following analytes were manually integrated due to incorrect integrations: Perfluorobutanesulfonate, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623955, 9623959, 9623961, 9623968, 9623975

The following analytes were manually integrated due to incorrect integrations: Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623964, 9623965, 9623966, 9623967, 9623969, 9623970, 9623972, 9623976, 9623979

The following analytes were manually integrated due to incorrect integrations: Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623971

The following analytes were manually integrated due to incorrect integrations: Perfluorononanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623960, 9623974, 9623977, 9623978, 9623980

The following analytes were manually integrated due to incorrect integrations: Perfluoronanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623973

The following analytes were manually integrated due to incorrect integrations:



Perfluorononanoic acid, Perfluoro-octanesulfonate

### Sample #s: 9623953, 9623958

The following analytes were manually integrated due to incorrect integrations:

Perfluorooctanoic acid, Perfluoroheptanoic acid, Perfluoroheptanoi

### Sample #s: 9623956, 9623957

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorohexanesulfonate

### Sample #s: 9623962, 9623963

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

### Batch #: 18144014 (Sample number(s): 9623953-9623968 UNSPK: 9623953)

The recovery(ies) for the following analyte(s) in the MS were below the acceptance window: Perfluoro-octanesulfonate

### Batch #: 18144015 (Sample number(s): 9623969-9623980 UNSPK: 9623971)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorocotanoic acid, Perfluoro-octanesulfonate

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

### SM 2540 G-1997 %Moisture Calc, Wet Chemistry

### Batch #: 18144820006A (Sample number(s): 9623953-9623961 BKG: 9623958)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture



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Sample Description: FR-FTA-SB03-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 09:30

SDG#: FSB10-01

**AECOM** 

ELLE Sample #: SW 9623953 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.60	0.80	1
14478	Perfluoroheptanoic acid	375-85-9	0.36 J	0.20	0.68	0.80	1
14478	Perfluorohexanesulfonate	355-46-4	1.0	0.20	0.64	0.80	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.68	0.80	1
14478	Perfluoro-octanesulfonate	1763-23-1	10	0.20	0.65	0.80	1
14478	Perfluorooctanoic acid	335-67-1	0.66 J	0.20	0.68	0.80	1
Wet CI		540 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	4.2	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						

### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## **Laboratory Sample Analysis Record**

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 12:39	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-FTA-SB03-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 09:40

SDG#: FSB10-02

**AECOM** 

ELLE Sample #: SW 9623954 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	0.43 J	0.21	0.71	0.84	1
14478	Perfluorohexanesulfonate	355-46-4	1.2	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.71	0.84	1
14478	Perfluoro-octanesulfonate	1763-23-1	18	0.21	0.68	0.84	1
14478	Perfluorooctanoic acid	335-67-1	1.0	0.21	0.71	0.84	1
Wet CI		540 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	7.5	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						

### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## **Laboratory Sample Analysis Record**

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 12:55	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-FTA-SB02-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 10:40

SDG#: FSB10-03

**AECOM** 

ELLE Sample #: SW 9623955 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EP/ tab	A 537 mod QSM 5.1 le B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.58	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.65	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	1.9	0.19	0.61	0.77	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.65	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	3.1	0.19	0.62	0.77	1
14478	Perfluorooctanoic acid	335-67-1	1.6	0.19	0.65	0.77	1
Wet CI		2540 G-1997 loisture Calc	%	%	%	%	
00111	Moisture	n.a.	3.5	0.50	0.50	0.50	1
	Moisture represents the loss in 103 - 105 degrees Celsius. The as-received basis.						

### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis** Analyst Dilution **Date and Time** Factor No. 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144014 06/04/2018 13:10 Joshua P Trost table B-15 PFAS Solid Prep - DoD EPA 537 mod QSM 5.1 18144014 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820006A 05/24/2018 13:17 Larry E Bevins 00111 Moisture 1 %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-FTA-SB02-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 10:50

SDG#: FSB10-04

**AECOM** 

ELLE Sample #: SW 9623956 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	0.69 J	0.21	0.71	0.84	1
14478	Perfluorohexanesulfonate	355-46-4	9.5	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.71	0.84	1
14478	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.21	0.68	0.84	1
14478	Perfluorooctanoic acid	335-67-1	17	0.21	0.71	0.84	1
Wet CI		640 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	5.4	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 06/04/2018 13:26 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144014 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144014 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820006A 05/24/2018 13:17 Larry E Bevins 00111 Moisture 1 %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-FTA-SB02-5D Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/21/2018 10:50
SDG#: FSB10-05FD

**AECOM** 

ELLE Sample #: SW 9623957 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA table	537 mod QSM 5.1 B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.62	0.83	1
14478	Perfluoroheptanoic acid	375-85-9	0.88	0.21	0.71	0.83	1
14478	Perfluorohexanesulfonate	355-46-4	12	0.21	0.67	0.83	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.71	0.83	1
14478	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.21	0.68	0.83	1
14478	Perfluorooctanoic acid	335-67-1	17	0.21	0.71	0.83	1
Wet Chemistry SM 2540 G-1997		%	%	%	%		
	<b>%M</b> o	isture Calc					
00111	Moisture	n.a.	5.7	0.50	0.50	0.50	1

### **Sample Comments**

CA ELAP Lab Certification No. 2792

as-received basis.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

### **Laboratory Sample Analysis Record**

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 13:41	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-FTA-SB01-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 11:53

SDG#: FSB10-06

**AECOM** 

ELLE Sample #: SW 9623958 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table E		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.40 J	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	0.39 J	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	1.5	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	0.30 J	0.20	0.64	0.79	1
14478	Perfluorooctanoic acid	335-67-1	0.28 J	0.20	0.67	0.79	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	4.3	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## **Laboratory Sample Analysis Record**

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 13:57	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006A	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-FTA-SB01-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 12:03

SDG#: FSB10-07

**AECOM** 

ELLE Sample #: SW 9623959 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	0.44 J	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	2.4	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	5.3	0.20	0.64	0.79	1
14478	Perfluorooctanoic acid	335-67-1	2.1	0.20	0.67	0.79	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	4.9	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis** Analyst Dilution **Date and Time** Factor No. 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144014 06/04/2018 14:43 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144014 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820006A 05/24/2018 13:17 Larry E Bevins 00111 Moisture 1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-100-SB01-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 14:10

SDG#: FSB10-08

**AECOM** 

ELLE Sample #: SW 9623960 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.60	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	1.5	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	1.8	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	0.77 J	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	140	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	5.2	0.20	0.69	0.81	1
Wet CI	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	7.3	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 06/04/2018 14:59 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144014 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144014 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820006A 05/24/2018 13:17 Larry E Bevins 00111 Moisture 1

<sup>\*=</sup>This limit was used in the evaluation of the final result



SW 9623961

1946800

**AECOM** 

**ELLE Sample #:** 

**ELLE Group #:** 

Matrix: Soil

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Sample Description: FR-100-SB01-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 14:20

SDG#: FSB10-09

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	0.50 J	0.21	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	1.3	0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	110	0.21	0.67	0.82	1
14478	Perfluorooctanoic acid	335-67-1	1.0	0.21	0.70	0.82	1
Wet CI	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	6.6	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144014 06/04/2018 15:14 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144014 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820006A 05/24/2018 13:17 Larry E Bevins 00111 Moisture 1 %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



SW 9623962

1946800

**AECOM** 

**ELLE Sample #:** 

**ELLE Group #:** 

Matrix: Soil

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Sample Description: FR-104-SB02-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 14:40

SDG#: FSB10-10

Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15  14478 Perfluorobutanesulfonate 375-73-5			ng/g	ng/g	ng/g	
Perfluorobutanesulfonate	375-73-5	0.33 J	0.20	0.61	0.81	1
Perfluoroheptanoic acid	375-85-9	6.5	0.20	0.69	0.81	1
Perfluorohexanesulfonate	355-46-4	38	0.20	0.65	0.81	1
Perfluorononanoic acid	375-95-1	3.7	0.20	0.69	0.81	1
Perfluoro-octanesulfonate	1763-23-1	570	2.0	6.6	8.1	10
Perfluorooctanoic acid	335-67-1	49	0.20	0.69	0.81	1
		%	%	%	%	
Moisture	n.a.	7.6	0.50	0.50	0.50	1
	MS Miscellaneous EPA table Perfluorobutanesulfonate Perfluoroheptanoic acid Perfluorohexanesulfonate Perfluorononanoic acid Perfluoro-octanesulfonate Perfluoroctanoic acid  emistry  SM 2 %MC	MS Miscellaneous EPA 537 mod QSM 5.1 table B-15  Perfluorobutanesulfonate 375-73-5 Perfluoroheptanoic acid 375-85-9 Perfluorohexanesulfonate 355-46-4 Perfluorononanoic acid 375-95-1 Perfluoro-octanesulfonate 1763-23-1 Perfluoroctanoic acid 335-67-1  emistry SM 2540 G-1997 %Moisture Calc	Analysis Name         CAS Number Result           MS Miscellaneous table B-15         EPA 537 mod QSM 5.1 rable B-15           Perfluorobutanesulfonate         375-73-5 0.33 J Perfluoroheptanoic acid           Perfluoroheptanoic acid         375-85-9 6.5 Perfluorohexanesulfonate           Perfluorononanoic acid         375-95-1 3.7 Perfluoro-octanesulfonate           Perfluorocotanoic acid         1763-23-1 570 Perfluoroctanoic acid           SM 2540 G-1997 %Moisture Calc         %	Analysis Name         CAS Number         Dry Result         Defection Limit*           MS Miscellaneous         EPA 537 mod QSM 5.1 table B-15         ng/g         ng/g           Perfluorobutanesulfonate         375-73-5 0.33 J 0.20         0.20           Perfluoroheptanoic acid         375-85-9 6.5 0.20         0.20           Perfluorohexanesulfonate         355-46-4 38 0.20         0.20           Perfluoro-octanesulfonate         1763-23-1 570 2.0         2.0           Perfluoroctanoic acid         335-67-1 49 0.20         0.20           emistry         SM 2540 G-1997 % % %         %	Analysis Name         CAS Number         Dry Result         Detection Limit*         Limit of Detection           MS Miscellaneous         EPA 537 mod QSM 5.1 rg/g         ng/g         ng/g         ng/g           Perfluorobutanesulfonate         375-73-5 0.33 J 0.20 0.61         0.20 0.69           Perfluoroheptanoic acid         375-85-9 6.5 0.20 0.69         0.69           Perfluorohexanesulfonate         355-46-4 38 0.20 0.65         0.20 0.65           Perfluoro-octanesulfonate         375-95-1 3.7 0.20 0.69         0.69           Perfluoro-octanesulfonate         1763-23-1 570 2.0 6.6         0.20 0.69           Perfluoroctanoic acid         335-67-1 49 0.20 0.69         0.69           emistry         SM 2540 G-1997 % % %         %         %	Analysis Name         CAS Number         Dry Result         Detection Limit*         Limit of Detection         Limit of Quantitation           MS Miscellaneous         EPA 537 mod QSM 5.1 table B-15         ng/g         ng/g         ng/g         ng/g           Perfluorobutanesulfonate         375-73-5         0.33 J         0.20         0.61         0.81           Perfluoroheptanoic acid         375-85-9         6.5         0.20         0.69         0.81           Perfluorohexanesulfonate         355-46-4         38         0.20         0.65         0.81           Perfluoro-octanesulfonate acid         375-95-1         3.7         0.20         0.69         0.81           Perfluoro-octanesulfonate Perfluoroctanoic acid         1763-23-1         570         2.0         6.6         8.1           Perfluoroctanoic acid         335-67-1         49         0.20         0.69         0.81           emistry         SM 2540 G-1997 %         %         %         %         %

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** No. Factor EPA 537 mod QSM 5.1 06/04/2018 15:30 14478 PFAS in Soil by LC/MS/MS-DoD 18144014 Joshua P Trost 1 table B-15 EPA 537 mod QSM 5.1 06/06/2018 10:04 PFAS in Soil by LC/MS/MS-DoD 18144014 Joshua P Trost 10 14478 table B-15 PFAS Solid Prep - DoD EPA 537 mod QSM 5.1 18144014 05/24/2018 17:00 Anthony C Polaski 14510 1 table B-15 00111 Moisture SM 2540 G-1997 18144820006B 05/24/2018 13:17 Larry E Bevins

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-104-SB02-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 14:58

SDG#: FSB10-11

**AECOM** 

ELLE Sample #: SW 9623963 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	1.7	0.21	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	8.6	0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	1.1	0.21	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	250	2.1	6.7	8.2	10
14478	Perfluorooctanoic acid	335-67-1	16	0.21	0.70	0.82	1
Wet Cl	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	8.1	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The n as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 15:45	Joshua P Trost	1
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/06/2018 10:20	Joshua P Trost	10
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-104-SB01-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 15:10

SDG#: FSB10-12

**AECOM** 

ELLE Sample #: SW 9623964 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	0.66 J	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	8.6	0.21	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	16	0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	8.1	0.21	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	170	2.1	6.7	8.2	10
14478	Perfluorooctanoic acid	335-67-1	51	0.21	0.70	0.82	1
Net Ch	Vet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	3.0	0.50	0.50	0.50	1

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis** Analyst Dilution **Date and Time** No. Factor EPA 537 mod QSM 5.1 14478 PFAS in Soil by LC/MS/MS-DoD 18144014 06/04/2018 16:01 Joshua P Trost 1 table B-15 EPA 537 mod QSM 5.1 06/07/2018 15:49 18144014 Joshua P Trost 10 PFAS in Soil by LC/MS/MS-DoD 14478 table B-15 PFAS Solid Prep - DoD EPA 537 mod QSM 5.1 18144014 05/24/2018 17:00 Anthony C Polaski 14510 1 table B-15 00111 Moisture SM 2540 G-1997 18144820006B 05/24/2018 13:17 Larry E Bevins

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-104-SB01-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 15:20

SDG#: FSB10-13

**AECOM** 

ELLE Sample #: SW 9623965 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.3	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	13	0.21	0.71	0.84	1
14478	Perfluorohexanesulfonate	355-46-4	58	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	8.5	0.21	0.71	0.84	1
14478	Perfluoro-octanesulfonate	1763-23-1	2,000	21	68	84	100
14478	Perfluorooctanoic acid	335-67-1	43	0.21	0.71	0.84	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	7.9	0.50	0.50	0.50	1
	Moisture represents the loss in 103 - 105 degrees Celsius. The as-received basis						

## **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 16:16	Joshua P Trost	1
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/06/2018 10:35	Joshua P Trost	100
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-145-SB02-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 16:00

SDG#: FSB10-14

**AECOM** 

ELLE Sample #: SW 9623966 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.58	0.78	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.66	0.78	1
14478	Perfluorohexanesulfonate	355-46-4	0.85	0.19	0.62	0.78	1
14478	Perfluorononanoic acid	375-95-1	0.21 J	0.19	0.66	0.78	1
14478	Perfluoro-octanesulfonate	1763-23-1	17	0.19	0.63	0.78	1
14478	Perfluorooctanoic acid	335-67-1	0.26 J	0.19	0.66	0.78	1
Wet CI	Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%	
00111	Moisture	n.a.	6.4	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The m as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 06/04/2018 16:32 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144014 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144014 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820006B 05/24/2018 13:17 Larry E Bevins 00111 Moisture 1 %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-145-SB02-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/21/2018 16:15

SDG#: FSB10-15

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ELLE Sample #: SW 9623967 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 n table B-15			ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.21	0.72	0.84	1
14478	Perfluorohexanesulfonate	355-46-4	0.24 J	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.72	0.84	1
14478	Perfluoro-octanesulfonate	1763-23-1	1.6	0.21	0.68	0.84	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.21	0.72	0.84	1
Wet CI		2540 G-1997 Disture Calc	%	%	%	%	
00111	Moisture	n.a.	6.9	0.50	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 16:47	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-100-SB01-5D Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/21/2018 14:20
SDG#: FSB10-16FD

**AECOM** 

ELLE Sample #: SW 9623968 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA tabl	3537 mod QSM 5.1 e B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	1.1	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	3.5	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	0.36 J	0.20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	340	2.0	6.4	7.9	10
14478	Perfluorooctanoic acid	335-67-1	3.0	0.20	0.67	0.79	1
Vet CI		2540 G-1997 oisture Calc	%	%	%	%	
00111	Moisture	n.a.	7.7	0.50	0.50	0.50	1
	Moisture represents the loss in 103 - 105 degrees Celsius. The as-received basis						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/04/2018 17:03	Joshua P Trost	1
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	06/06/2018 10:51	Joshua P Trost	10
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144014	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB02-1 Soil

Fresno PFC Phase II

**Project Name:** Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 07:47

SDG#: FSB10-17 **AECOM** 

ELLE Sample #: SW 9623969 **ELLE Group #:** 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS		EPA 537 mod QSM 5.1 table B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.58	0.78	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.66	0.78	1
14478	Perfluorohexanesulfonate	e 355-46-4	0.26 J	0.19	0.62	0.78	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.66	0.78	1
14478	Perfluoro-octanesulfonate	e 1763-23-1	3.5	0.19	0.63	0.78	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.19	0.66	0.78	1
Net Cl		SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	2.3	0.50	0.50	0.50	1

as-received basis.

## **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 02:25	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



SW 9623970

1

1946800

**AECOM** 

**ELLE Sample #:** 

0.50

**ELLE Group #:** 

Matrix: Soil

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Sample Description: FR-APR-SB02-5 Soil

Fresno PFC Phase II

Fresno Phase II **Project Name:** 

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 07:58

FSB10-18 SDG#:

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 53		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.22	0.66	0.88	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.22	0.75	0.88	1
14478	Perfluorohexanesulfonate	355-46-4	N.D.	0.22	0.71	0.88	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.22	0.75	0.88	1
14478	Perfluoro-octanesulfonate	1763-23-1	1.9	0.22	0.72	0.88	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.22	0.75	0.88	1
Net Cl	hemistry SM 254	40 G-1997	%	%	%	%	

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

SM 2540 G-1997 **%Moisture Calc** 

#### **Sample Comments**

10.4

0.50

0.50

CA ELAP Lab Certification No. 2792

Moisture

00111

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 02:40	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB04-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/22/2018 08:56
SDG#: FSB10-19BKG

**AECOM** 

ELLE Sample #: SW 9623971 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table E		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	0.42 J	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	4.7	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	1.2	0.20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	70	0.20	0.64	0.79	1
14478	Perfluorooctanoic acid	335-67-1	4.7	0.20	0.67	0.79	1
Wet CI		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	1.8	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.	•	, ,				

## **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 02:56	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB04-1 MS Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/22/2018 08:56
SDG#: FSB10-19MS

**AECOM** 

ELLE Sample #: SW 9623972 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EF tal	PA 537 mod QSM 5.1 ble B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.2	0.20	0.60	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	1.6	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	4.4	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	2.8	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	110	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	9.1	0.20	0.69	0.81	1
Wet Ch		M 2540 G-1997 Moisture Calc	%	%	%	%	
00118	Moisture	n.a.	1.8	0.50	0.50	0.50	1

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

		Labo	ratory S	Sample Analysis	Record		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 03:58	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1
00118	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB04-1 MSD Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/22/2018 08:56
SDG#: FSB10-19MSD

AECOM

ELLE Sample #: SW 9623973 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table E		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.2	0.19	0.58	0.78	1
14478	Perfluoroheptanoic acid	375-85-9	1.5	0.19	0.66	0.78	1
14478	Perfluorohexanesulfonate	355-46-4	2.2	0.19	0.62	0.78	1
14478	Perfluorononanoic acid	375-95-1	2.8	0.19	0.66	0.78	1
14478	Perfluoro-octanesulfonate	1763-23-1	37	0.19	0.63	0.78	1
14478	Perfluorooctanoic acid	335-67-1	2.3	0.19	0.66	0.78	1
Wet Cl		40 G-1997	%	%	%	%	
		sture Calc					
00118	Moisture	n.a.	1.8	0.50	0.50	0.50	1
00121	Moisture Duplicate	n.a.	1.9	0.50	0.50	0.50	1
	The duplicate moisture value is pr moisture test. For comparability p determination is the value used to	ourposes, the initial mois	sture				

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis** Analyst Dilution **Date and Time** No. Factor PFAS in Soil by LC/MS/MS-DoD 18144015 06/03/2018 04:13 Joshua P Trost 14478 EPA 537 mod QSM 5.1 table B-15 PFAS Solid Prep - DoD EPA 537 mod QSM 5.1 18144015 05/24/2018 17:00 Anthony C Polaski 14510 1 table B-15 SM 2540 G-1997 18144820006B 05/24/2018 13:17 Larry E Bevins 00118 Moisture 1 1 %Moisture Calc 18144820006B 05/24/2018 13:17 Larry E Bevins 00121 Moisture Duplicate SM 2540 G-1997 1 %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB04-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 09:04

SDG#: FSB10-20

AECOM
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ELLE Sample #: SW 9623974 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table E		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.63	0.84	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.21	0.71	0.84	1
14478	Perfluorohexanesulfonate	355-46-4	0.23 J	0.21	0.67	0.84	1
14478	Perfluorononanoic acid	375-95-1	0.29 J	0.21	0.71	0.84	1
14478	Perfluoro-octanesulfonate	1763-23-1	9.7	0.21	0.68	0.84	1
14478	Perfluorooctanoic acid	335-67-1	0.30 J	0.21	0.71	0.84	1
Vet Ch		40 G-1997 ture Calc	%	%	%	%	
00111	Moisture	n.a.	8.8	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

## **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	06/03/2018 03:11	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144015	05/24/2018 17:00	Anthony C Polaski	1
00111	Moisture	SM 2540 G-1997 %Moisture Calc	1	18144820006B	05/24/2018 13:17	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB05-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 09:40

SDG#: FSB10-21

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ELLE Sample #: SW 9623975 ELLE Group #: 1946800

Matrix: Soil

Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g	
Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
Perfluorohexanesulfonate	355-46-4	0.60 J	0.20	0.65	0.81	1
Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
Perfluoro-octanesulfonate	1763-23-1	2.5	0.20	0.66	0.81	1
Perfluorooctanoic acid	335-67-1	0.34 J	0.20	0.69	0.81	1
		%	%	%	%	
Moisture	n.a.	2.7	0.50	0.50	0.50	1
	MS Miscellaneous EPA table Perfluorobutanesulfonate Perfluoroheptanoic acid Perfluorohexanesulfonate Perfluorononanoic acid Perfluoro-octanesulfonate Perfluoroctanoic acid  emistry  SM 2	MS Miscellaneous EPA 537 mod QSM 5.1 table B-15  Perfluorobutanesulfonate 375-73-5 Perfluoroheptanoic acid 375-85-9 Perfluorohexanesulfonate 355-46-4 Perfluorononanoic acid 375-95-1 Perfluoro-octanesulfonate 1763-23-1 Perfluoroctanoic acid 335-67-1  emistry SM 2540 G-1997 %Moisture Calc	Analysis Name  CAS Number Result  MS Miscellaneous EPA 537 mod QSM 5.1 ng/g table B-15  Perfluorobutanesulfonate 375-73-5 N.D.  Perfluoroheptanoic acid 375-85-9 N.D.  Perfluorohexanesulfonate 355-46-4 0.60 J  Perfluorononanoic acid 375-95-1 N.D.  Perfluoro-octanesulfonate 1763-23-1 2.5  Perfluorooctanoic acid 335-67-1 0.34 J  emistry  SM 2540 G-1997 %  %Moisture Calc	Analysis Name         CAS Number         Dry Result         Detection Limit*           MS Miscellaneous         EPA 537 mod QSM 5.1 table B-15         ng/g         ng/g           Perfluorobutanesulfonate         375-73-5 N.D.         0.20           Perfluoroheptanoic acid         375-85-9 N.D.         0.20           Perfluorohexanesulfonate         355-46-4 0.60 J 0.20         0.20           Perfluorononanoic acid         375-95-1 N.D.         0.20           Perfluoro-octanesulfonate         1763-23-1 2.5 0.20         0.20           Perfluorooctanoic acid         335-67-1 0.34 J 0.20         0.20           emistry         SM 2540 G-1997 %         %           %Moisture Calc         0.20         0.20	Analysis Name         CAS Number         Dry Result         Detection Limit*         Limit of Detection           MS Miscellaneous         EPA 537 mod QSM 5.1 rg/g         ng/g         ng/g         ng/g           Perfluorobutanesulfonate         375-73-5 N.D.         0.20         0.61           Perfluoroheptanoic acid         375-85-9 N.D.         0.20         0.69           Perfluorohexanesulfonate         355-46-4 0.60 J 0.20         0.20         0.65           Perfluorononanoic acid         375-95-1 N.D.         0.20         0.69           Perfluoro-octanesulfonate         1763-23-1 2.5 0.20         0.66         0.69           Perfluoroctanoic acid         335-67-1 0.34 J 0.20         0.69           emistry         SM 2540 G-1997 % %         %         %	Analysis Name         CAS Number Result         Detection Limit*         Limit of Detection         Limit of Quantitation           MS Miscellaneous EPA 537 mod QSM 5.1 table B-15         ng/g         ng/g         ng/g         ng/g         ng/g           Perfluorobutanesulfonate Perfluoroheptanoic acid Perfluorohexanesulfonate Perfluorononanoic acid 375-85-9 N.D. 0.20 0.69 0.81         0.69 0.81         0.81           Perfluorononanoic acid Perfluorocotanesulfonate Perfluoro-octanesulfonate Perfluoro-octanesulfonate 1763-23-1 2.5 0.20 0.66 0.81         0.81         0.81           Perfluorocotanoic acid 335-67-1 0.34 J 0.20 0.69 0.81         0.81         0.81           Perfluorobutanesulfonate Calc         335-67-1 0.34 J 0.20 0.69 0.69 0.81         0.81

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144015 06/03/2018 03:27 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144015 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820005A 05/24/2018 09:13 William C Schwebel 00111 Moisture 1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-APR-SB05-5 Soil

Fresno PFC Phase II

Fresno Phase II **Project Name:** 

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 11:00

SDG#: FSB10-22 **AECOM** 

**ELLE Sample #:** SW 9623976 **ELLE Group #:** 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.21	0.64	0.85	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.21	0.72	0.85	1
14478	Perfluorohexanesulfonate	355-46-4	0.29 J	0.21	0.68	0.85	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.21	0.72	0.85	1
14478	Perfluoro-octanesulfonate	1763-23-1	1.7	0.21	0.69	0.85	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.21	0.72	0.85	1
Wet CI		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	5.9	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

#### Sample Comments

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 06/03/2018 03:42 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144015 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144015 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820005A 05/24/2018 09:13 William C Schwebel 00111 Moisture 1 %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: FR-157-SB02-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 11:12

SDG#: FSB10-23

ΑĿ	CC	M

ELLE Sample #: SW 9623977 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.57	0.76	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.65	0.76	1
14478	Perfluorohexanesulfonate	355-46-4	0.35 J	0.19	0.61	0.76	1
14478	Perfluorononanoic acid	375-95-1	1.4	0.19	0.65	0.76	1
14478	Perfluoro-octanesulfonate	1763-23-1	29	0.19	0.62	0.76	1
14478	Perfluorooctanoic acid	335-67-1	0.26 J	0.19	0.65	0.76	1
Vet Ch		540 G-1997 isture Calc	%	%	%	%	
00111	Moisture	n.a.	3.1	0.50	0.50	0.50	1
	Moisture represents the loss in v 103 - 105 degrees Celsius. The as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144015 06/03/2018 04:44 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144015 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820005A 05/24/2018 09:13 William C Schwebel 00111 Moisture 1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-157-SB02-1D Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/22/2018 11:12
SDG#: FSB10-24FD

**AECOM** 

ELLE Sample #: SW 9623978 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.58	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.66	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	1.1	0.19	0.62	0.77	1
14478	Perfluorononanoic acid	375-95-1	0.86	0.19	0.66	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	13	0.19	0.63	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.54 J	0.19	0.66	0.77	1
Vet Cl		2540 G-1997 oisture Calc	%	%	%	%	
00111	Moisture	n.a.	3.1	0.50	0.50	0.50	1
	Moisture represents the loss in 103 - 105 degrees Celsius. The as-received basis						

as-received basis.

#### **Sample Comments**

**Laboratory Sample Analysis Record** 

18144820005A

05/24/2018 09:13

William C Schwebel

1

CA ELAP Lab Certification No. 2792

00111 Moisture

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

SM 2540 G-1997

%Moisture Calc

#### Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 06/03/2018 05:00 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144015 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144015 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-157-SB01-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 11:47

SDG#: FSB10-25

**AECOM** 

ELLE Sample #: SW 9623979 ELLE Group #: 1946800

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/g	ng/g	ng/g	ng/g		
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	0.27 J	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	2.2	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.20	0.69	0.81	1
Wet CI		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	2.8	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144015 06/03/2018 05:16 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144015 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820005A 05/24/2018 09:13 William C Schwebel 00111 Moisture 1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-157-SB01-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 11:54

SDG#: FSB10-26

ELLE Croup #1 4046000	LLE Sample #:	SW 9623980
ELLE Group #: 1946600	LLE Group #:	1946800

Matrix:	Soil
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**AECOM** 

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA		ng/g	ng/g	ng/g	ng/g	
	table	B-15					
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	N.D.	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	4.1	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.20	0.69	0.81	1
Wet Ch		2540 G-1997 Disture Calc	%	%	%	%	
00111	Moisture	n.a.	4.8	0.50	0.50	0.50	1
	Moisture represents the loss in 103 - 105 degrees Celsius. The as-received basis.			ıt			

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. PFAS in Soil by LC/MS/MS-DoD 06/03/2018 05:31 Joshua P Trost 14478 EPA 537 mod QSM 5.1 1 18144015 table B-15 PFAS Solid Prep - DoD EPA 537 mod QSM 5.1 18144015 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820005A 05/24/2018 09:13 William C Schwebel 00111 Moisture 1 %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result

## **Quality Control Summary**

Client Name: AECOM Group Number: 1946800

Reported: 06/08/2018 13:45

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/g	ng/g	ng/g	ng/g
Batch number: 18144014	Sample num	ber(s): 962395	3-9623968	
Perfluorobutanesulfonate	N.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80
Batch number: 18144015	Sample num	ber(s): 9623969	9-9623980	
Perfluorobutanesulfonate	N.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80

#### LCS/LCSD

Analysis Name	LCS Spike Added ng/g	LCS Conc ng/g	LCSD Spike Added ng/g	LCSD Conc ng/g	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18144014	Sample number(	s): 9623953-9	9623968						
Perfluorobutanesulfonate	1.20	1.20	1.20	1.22	100	102	70-130	2	30
Perfluoroheptanoic acid	1.36	1.48	1.36	1.47	109	108	70-130	1	30
Perfluorohexanesulfonate	1.29	1.27	1.29	1.25	99	97	70-130	1	30
Perfluorononanoic acid	1.36	1.51	1.36	1.48	111	109	70-130	2	30
Perfluoro-octanesulfonate	1.30	1.35	1.30	1.31	104	101	70-130	3	30
Perfluorooctanoic acid	1.36	1.37	1.36	1.43	101	105	70-130	4	30
Batch number: 18144015	Sample number(	s): 9623969-9	9623980						
Perfluorobutanesulfonate	1.20	1.22			102		70-130		
Perfluoroheptanoic acid	1.36	1.45			107		70-130		
Perfluorohexanesulfonate	1.29	1.25			97		70-130		
Perfluorononanoic acid	1.36	1.46			108		70-130		
Perfluoro-octanesulfonate	1.30	1.28			99		70-130		
Perfluorooctanoic acid	1.36	1.41			104		70-130		

<sup>\*-</sup> Outside of specification

P##### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

## **Quality Control Summary**

Client Name: AECOM Group Number: 1946800

Reported: 06/08/2018 13:45

## LCS/LCSD (continued)

Analysis Name	LCS Spike Added %	LCS Conc %	LCSD Spike Added %	LCSD Conc %	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18144820005A	Sample number(	s): 9623975-9	9623980						
Moisture	89.5	89.39			100		99-101		
Batch number: 18144820006A	Sample number(	s): 9623953-9	9623961						
Moisture	89.5	89.41			100		99-101		
Batch number: 18144820006B	Sample number(	s): 9623962-9	9623974						
Moisture	89.5	89.41			100		99-101		
Moisture	89.5	89.41			100		99-101		
Moisture Duplicate	89.5	89.41			100		99-101		

#### MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/g	MS Spike Added ng/g	MS Conc ng/g	MSD Spike Added ng/g	MSD Conc ng/g	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 18144014	Sample number	er(s): 9623953-	9623968 U	NSPK: 9623953						
Perfluorobutanesulfonate	N.D.	1.13	1.22			108		70-130		
Perfluoroheptanoic acid	0.342	1.28	1.64			101		70-130		
Perfluorohexanesulfonate	0.965	1.21	2.07			91		70-130		
Perfluorononanoic acid	N.D.	1.28	1.36			106		70-130		
Perfluoro-octanesulfonate	9.76	1.23	9.69			-5 (2)		70-130		
Perfluorooctanoic acid	0.630	1.28	1.95			103		70-130		
Batch number: 18144015	Sample number	er(s): 9623969-	9623980 U	NSPK: 9623971						
Perfluorobutanesulfonate	N.D.	1.19	1.16	1.15	1.17	97	102	70-130	2	30
Perfluoroheptanoic acid	0.413	1.35	1.59	1.30	1.46	87	81	70-130	8	30
Perfluorohexanesulfonate	4.64	1.27	4.28	1.23	2.20	-27*	-198*	70-130	64*	30
Perfluorononanoic acid	1.17	1.35	2.76	1.30	2.74	118	121	70-130	1	30
Perfluoro-octanesulfonate	69.18	1.29	107.93	1.24	36.34	3011 (2)	-2652 (2)	70-130	99*	30
Perfluorooctanoic acid	4.64	1.35	8.97	1.30	2.28	321*	-181 <sup>*</sup>	70-130	119*	30

## **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	<b>DUP Conc</b>	DUP RPD	DUP RPD Max
	%	%		

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

## **Quality Control Summary**

Client Name: AECOM Group Number: 1946800

Reported: 06/08/2018 13:45

## **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc %	DUP Conc %	DUP RPD	DUP RPD Max
Batch number: 18144820005A	Sample number(s): 9623		22850	
Moisture	3.51	3.52	0	5
Batch number: 18144820006A	Sample number(s): 9623	953-9623961 BKG: 96	23958	
Moisture	4.31	5.13	17*	5
Batch number: 18144820006B	Sample number(s): 9623	962-9623974 BKG: 96	23971, P623971	
Moisture	1.84	1.94	5 (1)	5
Moisture	1.84	1.94	5 (1)	5
Moisture Duplicate	1.84	1.94	5 (1)	5

## **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18144014

	13C3-F	PFBS	13C3-F	PFHxS	13C4-F	PFHpA	13C8-	PFOA	13C8-F	PFOS	13C9-F	PFNA	
	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD	
		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)	
9623953	80	0.58	79	0.58	76	0.58	76	0.58	81	0.87	82	0.38	
9623954	75	0.58	76	0.58	74	0.58	72	0.58	79	0.87	75	0.39	
9623955	71	0.56	74	0.56	72	0.56	74	0.56	73	0.83	72	0.37	
9623956	74	0.59	78	0.59	76	0.59	75	0.59	76	0.89	74	0.40	
9623957	79	0.59	79	0.59	77	0.59	78	0.59	83	0.88	81	0.39	
9623958	78	0.57	77	0.57	79	0.57	78	0.57	78	0.85	80	0.38	
9623959	85	0.56	83	0.56	82	0.56	84	0.56	86	0.84	85	0.37	
9623960	76	0.56	79	0.56	80	0.56	76	0.56	79	0.84	83	0.37	
9623961	81	0.58	78	0.58	83	0.58	80	0.58	84	0.87	87	0.38	
9623962	83	0.56	86	0.56	88	0.56	86	0.56	93	0.84	97	0.37	
9623963	86	0.57	89	0.57	88	0.57	88	0.57	90	0.85	92	0.38	
9623964	82	1.2	87	1.2	86	1.2	78	1.2	80	1.8	85	0.80	
9623965	86	0.58	84	0.58	87	0.58	84	0.58	90	0.87	121	0.38	
9623966	76	0.55	79	0.55	78	0.55	76	0.55	83	0.82	77	0.36	
9623967	76	0.59	82	0.59	75	0.59	79	0.59	76	0.88	79	0.39	
9623968	85	0.55	88	0.55	89	0.55	86	0.55	94	0.82	97	0.36	
Blank	72	1.2	78	1.2	78	1.2	78	1.2	76	1.8	80	0.80	
LCS	76	1.2	78	1.2	78	1.2	81	1.2	87	1.8	80	0.80	
LCSD	75	1.2	83	1.2	80	1.2	83	1.2	79	1.8	87	0.80	
MS	75	0.57	76	0.57	77	0.57	77	0.57	80	0.85	80	0.38	

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.



## **Quality Control Summary**

Client Name: AECOM Group Number: 1946800

Reported: 06/08/2018 13:45

#### **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18144014

Limits: 50-150 50-150 50-150 50-150 50-150 50-150

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number	er: 18144	1015											
	13C3-l	PFBS	13C3-F	FHxS	13C4-F	PFHpA	13C8-F	PFOA	13C8-F	PFOS	13C9-F	FNA	
	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD	
		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)	
9623969	81	0.57	74	0.57	69	0.57	72	0.57	74	0.86	71	0.38	
9623970	94	0.59	92	0.59	89	0.59	92	0.59	91	0.89	90	0.40	
9623971	82	0.58	78	0.58	76	0.58	80	0.58	82	0.87	82	0.39	
9623972	73	0.59	68	0.59	68	0.59	67	0.59	72	0.89	70	0.40	
9623973	77	0.57	72	0.57	69	0.57	71	0.57	75	0.86	70	0.38	
9623974	86	0.57	83	0.57	82	0.57	76	0.57	87	0.86	79	0.38	
9623975	87	0.59	86	0.59	77	0.59	79	0.59	87	0.89	78	0.40	
9623976	97	1.2	94	1.2	96	1.2	93	1.2	95	1.8	96	0.80	
9623977	87	0.56	83	0.56	72	0.56	72	0.56	85	0.83	74	0.37	
9623978	86	0.56	82	0.56	80	0.56	83	0.56	84	0.84	83	0.37	
9623979	97	0.59	97	0.59	87	0.59	92	0.59	98	0.89	96	0.40	
9623980	90	0.58	91	0.58	89	0.58	85	0.58	91	0.87	92	0.38	
Blank	86	1.2	73	1.2	78	1.2	77	1.2	81	1.8	79	0.80	
LCS	84	1.2	81	1.2	81	1.2	84	1.2	87	1.8	90	0.80	
MS	73	0.59	68	0.59	68	0.59	67	0.59	72	0.89	70	0.40	
MSD	77	0.57	72	0.57	69	0.57	71	0.57	75	0.86	70	0.38	
Limits:	50-15	50	50-15	0	50-15	0	50-15	60	50-15	0	50-15	0	

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

# 42343 [946800 9623953-80] Chain of Custody

**AECOM** 

3101 Wilson Blvd Suite 900

Arlington, Virginia 22201

**AECOM** 

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Fresno					FR- FTAS	B03-1	5.21-18	0930	5	2		X	X	X	X	×	×					
Fresno					FR-FTA-SB	03-5	5-21-18	0140	5	2		X	X	X	X	X	×					
Fresno					FR-FTA-S		5-21-18	1040	5	2		$\lambda$	X	X	×	×	X					
Fresno					FR- FTA-51	602-5	5.21.18	1059	5	2		X	X	X	X	×	×	17				
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Fregno					FR-100-58		5-21-18	1410	5	2		X	X	X	X	X	X		1			
Fresmo					FR-100-581		5 - 21 - 18	1420	5	2		X	X	X	X	X	X					
Fresno					FR-104-58	102-1	5-21-18	1440	5	2		X	X	X	X	×	X					
Fresno					FR. 164. 88		5.21.18	1458	5	2		X	X	X	×	X	X					
Fresho					FR-104-580		5.21.18	1510	5	2		X	×	X	X	×	X					
Fresno					FR-104-580		5.21.18	1520	5	2		X	X	X	X	X	X					
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42343 1946800 9623953-80 Chain of Custody

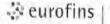
AECOM

3101 Wilson Blvd Suite 900

Arlington, Virginia 22201

**AECOM** 

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LOCID	SBD	SED	SA Code	Samp No	Sampl	e I.D.	Date	Time	Matrix	No. of Con.	Cooler No.	Ha	PF	FFNA	PFI	PFHOA	PFS			Comment		
lesno					FR-145-58	02-1	5.24-18	1600	2	2		X	X	X	X	×	X		5			
Fregno					FR-145-58		5.21.18		5	2		X	X	>	×	>	×					
Fresno					FR-100-530	1-5D	5-21-18	14151920	5	2		x	×	×	×	×	X					
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Fresm					FR-APR-SBO	4-1	5-22-18	0856	S	6		X	X	X	X	×	X					
Fresto					FR- APR-SBOU	1-5	5-22-18	0904	S	2		X	X	X	×	×	>					
Fresno					FR- APR-580		5.22.18	0940	5	2		X	×	>	×	×	×					
Fregra					FR-APR-SBOS	-5	5.22.18	1100	5	2		X	×	×	X	×	X					
Fresno					FR-157-5807	4-1	5.22.18	1112	5	2		X	×	×	*	X	X	ys.				
Fresto				d Total	FR-157-580	2-10	5-22-18	1112	5	2		X	>	×	×	X	×			1		
Fresos					FR- 157- SBO	1-1	5.22.18	1147	5	2		X	X	X	×	×	×					
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Lançaster Laboratories Environmental

## Sample Administration Receipt Documentation Log

Doc Log ID: 217202 Group Number(s): QU 6800

Client: AECOM

**Delivery and Receipt Information** 

Delivery Method:

Fed Ex

Arrival Timestamp:

05/23/2018 10:05

Number of Packages:

2

Number of Projects:

1

State/Province of Origin:

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

Custody Seal Present:

Yes

Sample Date/Times match COC:

Yes

Custody Seal Intact:

Paperwork Enclosed:

Yes

VOA Vial Headspace ≥ 6mm:

N/A

Samples Chilled:

Yes Yes

Total Trip Blank Qty: Air Quality Samples Present: 0 No

Samples Intact:

Missing Samples:

Yes

No

Extra Samples:

No

Discrepancy in Container Qty on COC: No

Unpacked by Simon Nies (25112) at 17:04 on 05/23/2018

Samples Chilled Details

Thermometer Types:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler# ice Container Elevated Temp? Thermometer ID Corrected Temp Therm. Type ce Type Ice Present? 1 DT42-02 1.9 DT Wet Y Bagged N DT 2 DT42-02 5.4 Wet Bagged N



## **Explanation of Symbols and Abbreviations**

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	mg	milligram(s)
С	degrees Celsius	mL	milliliter(s)
cfu	colony forming units	MPN	Most Probable Number
<b>CP Units</b>	cobalt-chloroplatinate units	N.D.	non-detect
F	degrees Fahrenheit	ng	nanogram(s)
g	gram(s)	NTU	nephelometric turbidity units
IU	International Units	pg/L	picogram/liter
kg	kilogram(s)	RL	Reporting Limit
L	liter(s)	TNTC	Too Numerous To Count
lb.	pound(s)	μg	microgram(s)
m3	cubic meter(s)	μL	microliter(s)
meq	milliequivalents	umhos/cm	micromhos/cm
<	less than		
>	greater than		
ppm		be equivalent to milli	kilogram (mg/kg) or one gram per million grams. For grams per liter (mg/l), because one liter of water has a weight uivalent to one microliter per liter of gas.
ppb	parts per billion		
Dry weight basis			oisture content. This increases the analyte weight ample without moisture. All other results are reported on an

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.



## **Data Qualifiers**

Qualifier	Definition
С	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
Р	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised
	due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.









#### **ANALYSIS REPORT**

Prepared by:

Prepared for:

Eurofins Lancaster Laboratories Environmental 2425 New Holland Pike Lancaster, PA 17601 AECOM Suite 150 12420 Milestone Center Drive Germantown MD 20876

Report Date: June 06, 2018 21:12

Project: Fresno Phase II

Account #: 42343 Group Number: 1946801 SDG: FSB11 PO Number: 93872 State of Sample Origin: CA

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at <a href="http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/">http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/</a>. To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To AECOM Electronic Copy To AECOM Electronic Copy To AECOM Attn: Todd Church Attn: Naoum Tavantzis Attn: Mike Myers

Respectfully Submitted,

Lay How

Kay Hower

(717) 556-7364









#### **SAMPLE INFORMATION**

Client Sample Description	Sample Collection Date/Time	ELLE#
FR-157-SB03-1 Soil	05/22/2018 12:18	9623981
FR-157-SB03-5 Soil	05/22/2018 12:25	9623982
FR-FRB-052218 Water	05/22/2018 14:25	9623983
FR-157-SB02-5 Soil	05/22/2018 11:25	9623984

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.





Project Name: Fresno Phase II ELLE Group #: 1946801

#### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

#### **Analysis Specific Comments:**

#### EPA 537 mod QSM 5.1 table B-15, LC/MS/MS Miscellaneous

Sample #s: 9623981, 9623984

The following analytes were manually integrated due to incorrect integrations: Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9623982

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluoronanoic acid, Perfluoroheptanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Batch #: 18144015 (Sample number(s): 9623981-9623982, 9623984 UNSPK: P623971)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluoro-octanoic acid, Perfluoro-octanesulfonate

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### SM 2540 G-1997 %Moisture Calc, Wet Chemistry

Batch #: 18144820007A (Sample number(s): 9623981-9623982, 9623984 BKG: P621828)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture



SW 9623981

1946801

**AECOM** 

**ELLE Sample #:** 

**ELLE Group #:** 

Matrix: Soil

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: FR-157-SB03-1 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 12:18

SDG#: FSB11-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table l		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	0.30 J	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	1.5	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	N.D.	0.20	0.69	0.81	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	2.7	0.50	0.50	0.50	1
	Moisture represents the loss in with 103 - 105 degrees Celsius. The nas-received basis.	eight of the sample after	oven drying at			0.00	·

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 06/03/2018 05:47 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144015 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144015 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820007A 05/24/2018 13:40 Larry E Bevins 00111 Moisture 1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-157-SB03-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 12:25

SDG#: FSB11-02

AECOM	
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ELLE Sample #: SW 9623982 ELLE Group #: 1946801

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
.C/MS	/MS Miscellaneous EPA table		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.20	0.61	0.81	1
14478	Perfluoroheptanoic acid	375-85-9	0.29 J	0.20	0.69	0.81	1
14478	Perfluorohexanesulfonate	355-46-4	1.6	0.20	0.65	0.81	1
14478	Perfluorononanoic acid	375-95-1	1.6	0.20	0.69	0.81	1
14478	Perfluoro-octanesulfonate	1763-23-1	44	0.20	0.66	0.81	1
14478	Perfluorooctanoic acid	335-67-1	0.33 J	0.20	0.69	0.81	1
Wet Chemistry SM 2540 G-1997 %Moisture Calc		%	%	%	%		
00111	Moisture	n.a.	2.8	0.50	0.50	0.50	1
	Moisture represents the loss in v 103 - 105 degrees Celsius. The as-received basis.						

#### **Sample Comments**

18144820007A

CA ELAP Lab Certification No. 2792

**Analysis Name** 

PFAS in Soil by LC/MS/MS-DoD

PFAS Solid Prep - DoD

CAT

14478

14510

00111 Moisture

No.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

table B-15 SM 2540 G-1997

%Moisture Calc

#### **Laboratory Sample Analysis Record** Method Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor 06/03/2018 06:02 EPA 537 mod QSM 5.1 1 18144015 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 18144015 05/24/2018 17:00 Anthony C Polaski 1

05/24/2018 13:40

Larry E Bevins

1

<sup>\*=</sup>This limit was used in the evaluation of the final result



2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: FR-FRB-052218 Water

Fresno PFC Phase II

Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/22/2018 14:25
SDG#: FSB11-03FB

**Project Name:** 

**AECOM** 

ELLE Sample #: WW 9623983 ELLE Group #: 1946801

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/	MS Miscellaneous EPA 537 r table B-15		ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.99	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.27	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.99	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.54	2.1	2.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.27	1.1	1.8	1

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

	Laboratory Sample Analysis Record							
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor	
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18144010	06/03/2018 01:07	Joshua P Trost	1	
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18144010	05/24/2018 09:10	Courtney J Fatta	1	

<sup>\*=</sup>This limit was used in the evaluation of the final result



2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEny

Sample Description: FR-157-SB02-5 Soil

Fresno PFC Phase II

Project Name: Fresno Phase II

Submittal Date/Time: 05/23/2018 10:05 Collection Date/Time: 05/22/2018 11:25

SDG#: FSB11-04

Α	E	C	0	V	ı
m	_	v	v	IV	

ELLE Sample #: SW 9623984 ELLE Group #: 1946801

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA table	· · · · · · · · · · · · · · · · · · ·	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.58	0.77	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.66	0.77	1
14478	Perfluorohexanesulfonate	355-46-4	0.43 J	0.19	0.62	0.77	1
14478	Perfluorononanoic acid	375-95-1	0.53 J	0.19	0.66	0.77	1
14478	Perfluoro-octanesulfonate	1763-23-1	46	0.19	0.63	0.77	1
14478	Perfluorooctanoic acid	335-67-1	0.23 J	0.19	0.66	0.77	1
Wet Ch		540 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	5.9	0.50	0.50	0.50	1
	Moisture represents the loss in w 103 - 105 degrees Celsius. The r as-received basis.						

#### **Sample Comments**

CA ELAP Lab Certification No. 2792

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Dilution **Date and Time** Factor No. 06/03/2018 06:18 14478 PFAS in Soil by LC/MS/MS-DoD EPA 537 mod QSM 5.1 1 18144015 Joshua P Trost table B-15 EPA 537 mod QSM 5.1 PFAS Solid Prep - DoD 18144015 05/24/2018 17:00 Anthony C Polaski 1 14510 table B-15 SM 2540 G-1997 18144820007A 05/24/2018 13:40 Larry E Bevins 00111 Moisture 1 %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result

### **Quality Control Summary**

Client Name: AECOM Group Number: 1946801

Reported: 06/06/2018 21:12

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/g	ng/g	ng/g	ng/g
Batch number: 18144015	Sample num	ber(s): 962398	1-9623982,96	23984
Perfluorobutanesulfonate	N.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80
	ng/l	ng/l	ng/l	ng/l
Batch number: 18144010	Sample num	ber(s): 962398	3	
Perfluorobutanesulfonate	N.D.	0.30	1.1	2.0
Perfluoroheptanoic acid	N.D.	0.30	1.2	2.0
Perfluorohexanesulfonate	N.D.	0.40	1.1	2.0
Perfluorononanoic acid	N.D.	0.40	1.2	2.0
Perfluoro-octanesulfonate	N.D.	0.60	2.3	3.0
Perfluorooctanoic acid	N.D.	0.30	1.2	2.0

#### LCS/LCSD

Analysis Name	LCS Spike Added ng/g	LCS Conc ng/g	LCSD Spike Added ng/g	LCSD Conc ng/g	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18144015	Sample number(	s): 9623981-9	9623982,9623984						
Perfluorobutanesulfonate	1.20	1.22			102		70-130		
Perfluoroheptanoic acid	1.36	1.45			107		70-130		
Perfluorohexanesulfonate	1.29	1.25			97		70-130		
Perfluorononanoic acid	1.36	1.46			108		70-130		
Perfluoro-octanesulfonate	1.30	1.28			99		70-130		
Perfluorooctanoic acid	1.36	1.41			104		70-130		
	ng/l	ng/l	ng/l	ng/l					
Batch number: 18144010	Sample number(	s): 9623983							
Perfluorobutanesulfonate	4.81	4.45			92		70-130		
Perfluoroheptanoic acid	5.44	5.88			108		70-130		
Perfluorohexanesulfonate	5.14	4.72			92		70-130		
Perfluorononanoic acid	5.44	5.62			103		70-130		
Perfluoro-octanesulfonate	5.20	5.00			96		70-130		

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

### **Quality Control Summary**

Client Name: AECOM Group Number: 1946801

Reported: 06/06/2018 21:12

#### LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorooctanoic acid	5.44	5.54			102		70-130		
	%	%	%	%					
Batch number: 18144820007A Moisture	Sample number( 89.5	s): 9623981-9 89.43	9623982,9623984		100		99-101		

#### MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/g	MS Spike Added ng/g	MS Conc ng/g	MSD Spike Added ng/g	MSD Conc ng/g	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 18144015	Sample number	er(s): 9623981-	9623982,96	623984 UNSPK:	P623971					
Perfluorobutanesulfonate	N.D.	1.19	1.16	1.15	1.17	97	102	70-130	2	30
Perfluoroheptanoic acid	0.413	1.35	1.59	1.30	1.46	87	81	70-130	8	30
Perfluorohexanesulfonate	4.64	1.27	4.28	1.23	2.20	-27*	-198*	70-130	64*	30
Perfluorononanoic acid	1.17	1.35	2.76	1.30	2.74	118	121	70-130	1	30
Perfluoro-octanesulfonate	69.18	1.29	107.93	1.24	36.34	3011 (2)	-2652 (2)	70-130	99*	30
Perfluorooctanoic acid	4.64	1.35	8.97	1.30	2.28	321*	-181*	70-130	119*	30
	ng/l	ng/l	ng/l	ng/l	ng/l					
Batch number: 18144010	Sample number	er(s): 9623983	UNSPK: P6	320952						
Perfluorobutanesulfonate	N.D.	4.20	4.24	4.28	4.34	101	101	70-130	2	30
Perfluoroheptanoic acid	0.310	4.75	5.39	4.84	5.11	107	99	70-130	5	30
Perfluorohexanesulfonate	N.D.	4.49	4.49	4.58	4.66	100	102	70-130	4	30
Perfluorononanoic acid	N.D.	4.75	5.02	4.84	4.93	106	102	70-130	2	30
Perfluoro-octanesulfonate	N.D.	4.54	4.87	4.63	5.14	107	111	70-130	5	30
Perfluorooctanoic acid	0.784	4.75	5.83	4.84	5.94	106	107	70-130	2	30

#### **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max
	%	%		
Batch number: 18144820007A	Sample number(s): 9623	981-9623982,9623984	BKG: P621828	
Moisture	35.55	32.67	8*	5

<sup>\*-</sup> Outside of specification

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

### **Quality Control Summary**

Client Name: AECOM Group Number: 1946801

Reported: 06/06/2018 21:12

#### **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD

Batch number: 18144010

	13C3-F	PFBS	13C3-F	FHxS	13C4-F	PFHpA	13C8-F	PFOA	13C8-F	FOS	13C9-F	PFNA
	%Rec	LOD	%Rec	LOD	%Rec	LÓD	%Rec	LOD	%Rec	LOD	%Rec	LOD
		(ng/l)										
9623983	97	9.0	77	9.0	77	1.8	85	1.8	91	9.0	107	1.8
Blank	86	10	87	10	85	2.0	87	2.0	89	10	89	2.0
LCS	96	10	87	10	90	2.0	88	2.0	88	10	92	2.0
MS	144	8.7	84	8.7	91	1.7	83	1.7	84	8.7	93	1.7
MSD	150	8.9	84	8.9	90	1.8	90	1.8	91	8.9	105	1.8
Limits:	50-15	0	50-15	0	50-15	0	50-15	60	50-15	0	50-15	0

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18144015

Daterrium	JCI. 10177	FO 10											
	13C3-I	PFBS	13C3-F	PFHxS	13C4-F	PFHpA	13C8-PFOA		13C8-F	PFOS	13C9-PFNA		
	%Rec	LOD	%Rec	LOD	%Rec	LÓD	%Rec	LOD	%Rec	LOD	%Rec	LOD	
		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)		(ng/g)	
9623981	85	0.59	81	0.59	80	0.59	81	0.59	82	0.89	78	0.40	
9623982	102	0.59	94	0.59	94	0.59	93	0.59	99	0.89	93	0.40	
9623984	89	0.55	88	0.55	88	0.55	86	0.55	89	0.82	93	0.36	
Blank	86	1.2	73	1.2	78	1.2	77	1.2	81	1.8	79	0.80	
LCS	84	1.2	81	1.2	81	1.2	84	1.2	87	1.8	90	0.80	
MS	73	0.59	68	0.59	68	0.59	67	0.59	72	0.89	70	0.40	
MSD	77	0.57	72	0.57	69	0.57	71	0.57	75	0.86	70	0.38	
Limits:	50-15	50	50-15	0	50-15	0	50-15	60	50-15	0	50-15	0	

P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

# 42343 [9468c] 9623981-84 Chain of Custody

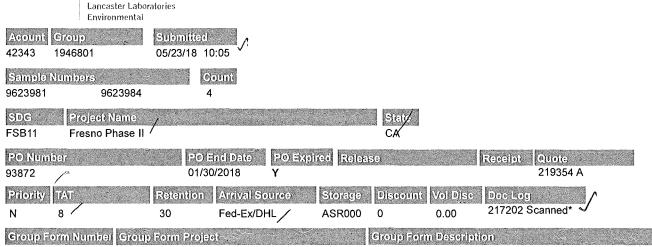
**AECOM** 

**AECOM** 

3101 Wilson Blvd Suite 900

Arlington, Virginia 22201

Laboratory						Project Name									AI	nalys	sis		Т	-	Chain of C	ustody No.	
Eurofins L Address 2425 No	Lonce	Holle	r Land	pik	tory	Point of Conta Mike Site Contact/			820-7	3246								2		E	2018 Batch May	0\$22-1 16	71
Concaster		State P/			Zip Code 17601	The same than the same	Phone No. Glenn								VIII.								
	VIS Info				18.7		er Sample Ini		16			A	1	A	X	A	12						
LOCID	T	SED	SA Code	Samp No	Samp		Date	Time	Matrix	No. of Con.	Cooler No.	PFO	8 Fas	PFNA	PFH.	DF BS				C	Comment		
Fresno			Zan VI	1314	FR- 157- 58	503.1	5-22-18	1218	S	2		X	X	X	X	>	X						
fregro					FR- 157- SE	303 - 5	5.22-18	1225	5	2		X	X	X	2	>	×						
Fresno	1				FR-FRR- OF		5-22-18	1425	W	1		X	X	X	4	7	X						
Fresho					FR-157-581		5-22-18	1125	5	2		X	4	X	×	X	A						
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S/A/Audit  $\mathcal{N}_{\mathcal{M}}$ 2308 **GS Audit** 50 Dévartments 33 38 52 55

(alela)

297699

**AECOM-PFC** Analysis

SW/WW: PFCs

#### Billing Address

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Email: \* todd.church@aecom.com

#### Copies To

\* AECOM

Ms. Laura Mullen

Laura.Mullen@aecom.com

Copies To

Data Package Group

Ν

Fax:

#### E|0)0)

Format: ERPIMS LAB-PERF

Generate: Group Contact: Mike Myers

E-Mail: mike.myers@aecom.com (EDD)

Contact: Naoum Tavantzis

E-Mail: naoum.tavantzis@aecom.com (EDD)

Contact: Todd Church

E-Mail: todd.church@aecom.com (EDD)

Contact: Laura Mullen

E-Mail: Laura.Mullen@aecom.com (EDD)

**EDD Comment:** 

#### (d(d):

Format: ERPIMS v6 Generate: Group

Contact: Mike Myers

E-Mail: mike.myers@aecom.com (EDD)

Contact: Naoum Tavantzis

E-Mail: naoum.tavantzis@aecom.com (EDD)

Contact: Todd Church

E-Mail: todd.church@aecom.com (EDD)

Contact: Laura Mullen

E-Mail: Laura.Mullen@aecom.com (EDD)

EDD Comment:

Per client request, send 6 files for each ERPIMS EDD set: \*.SMP.txt, \*.TST.txt, \*.RES.txt,

\*.FREQ.txt, \*.PERF.txt, and \*Lab Sample\*Data.txt

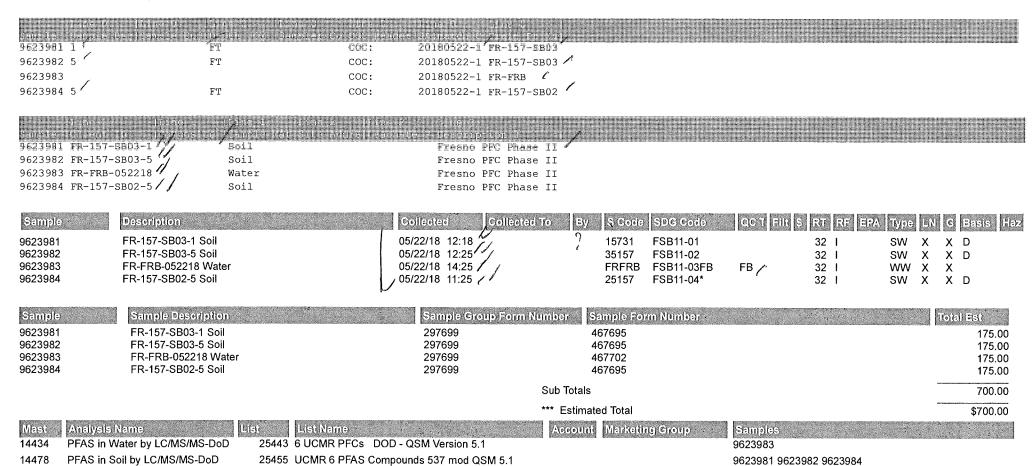
#### Data Pankage

PkgType: I-DOD

Due: 06/13/2018 (21 cal. days from subm./close)

Contact: Naoum Tavantzis Contact: Mike Myers Contact: Todd Church

Lancaster Laboratories Environmental



Lancaster Laboratories Environmental

Samples and Analyses

	14434 PFAS in Water by LC/MS/MS-DoD (List:25443)	14465 PFAS Water Prep - DoD	14478 PFAS in Soil by LC/MS/MS-DoD (List:25455)	1/4510 PFAS Solid Prep - DoD	04613 Diskette Deliverable	10946 DoD Type I	10089 Analysis Report Narrative	X 00111 Moisture
9623981 FR-157-SB03-1 Soil			χ/	X/	X	<b>X</b> /	×	X
9623982 FR-157-SB03-5 Soil			Х	X/	-	X/		X/
9623983 FR-FRB-052218 Water	X	X				X		-
9623984 FR-157-SB02-5 Soil	_	1	X	X	1	X	1	х

Mast	D)e(o)	Analysis Name	(a)	WAT	(i)(a)	Pirice	
00111	6055	Moisture	N	10	3	0.00	
04613	4038	Diskette Deliverable	Ν	8	1	0.00	
10089	4052	Analysis Report Narrative	Ν	8	1	0.00	
10946	4038	DoD Type I	Ν	10	4	0.00	
14434	4033	PFAS in Water by LC/MS/MS-DoD	N	10	1	175.00	۸
14465	4033	PFAS Water Prep - DoD	N	10	1	0.00	
14478	4033	PFAS in Soil by LC/MS/MS-DoD	N	10	3	175.00	٨
14510	4033	PFAS Solid Prep - DoD	N	10	3	0.00	

Sub Totals

\*\*\* Estimated Total

Ne/Fest	Bilter (Se)	Units	Method
0.00	77	%	SM 2540 G-1997 %Moisture Calc
0.00		NO PRINT	N/A
0.00		NO PRINT	N/A
0.00		NO PRINT	N/A
175.00	201	ng/l	EPA 537 mod QSM 5.1 table B-15
0.00		NO PRINT	EPA 537 mod QSM 5.1 table B-15
525.00	170	ng/g	EPA 537 mod QSM 5.1 table B-15
0.00		NO PRINT	EPA 537 mod QSM 5.1 table B-15

^ Analysis is on the Quote without the list

700.00

\$700.00

Client Line Codes

Trevel Trips:

Printed on 5/23/2018 7:25:13PM

Version 2.7.18

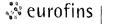
# 42343 [4468c] 9623981 - 84 **Chain of Custody**

**AECOM** 

3101 Wilson Blvd Suite 900

A=COM

Arlington, Virginia 22201 PAGE 3 OF 3Phone No. (703) 682-4900; Fax No. (703) 682-4901 Chain of Custody No. Laboratory Project Name Analysis Eurofins Loncaster Laboratory Address PFC PLOSE 11
Point of Contact / Phone No. 20180522-1 Batch May 16 2425 New Holland Pike Mike Myers (301) 820-3246 Site Contact / Phone No. Zip Code Concaster PA 17601 MSgt. Glenn Marte PFNA PFOA ) Other Sample Information P FOS **ERPIMS Information** DFH PFH SA Samp No. of Cooler LOCID SBD SED Matrix Sample I.D. Date Time Comment Code No Con. No. S FR- 157-5803. 1 5.22.18 1218 2 Fresno FR. 157. SBC3. 5 1225 S 5.22-1A fregre W FR-FRR-052218 Tresno 1425 8.77.18 FR-157-5802-5 8-22-18 1125 Mesne 5 2 b X  $\lambda$  $\sim$ Relinquished By/Company A ASOAM AECOM Date 5-72-18 Time 1560 Received By / Company FCALX D: 811915198019 / Date 5・22・(も Time 811915188020 1500 2. Relinguished By / Company 2. Received By / Company Date Time Time 3. Relinguished By / Company Date Time 3. Received By / Company Date Time 4. Relinquished By / Company Date Time 4. Received By / Company Time Date 5. Relinquished By / Company Date Time 5. Received By / Company Time 19905 Comments Shipment Method/Airbill No.



Lancaster Laboratories Environmental

# Sample Administration Receipt Documentation Log

Doc Log ID: 217202

Client: AECOM

**Delivery and Receipt Information** 

Delivery Method:

Fed Ex

Arrival Timestamp:

05/23/2018 10:05

Number of Packages:

2

Number of Projects:

1

State/Province of Origin:

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

Custody Seal Present:

Yes

Sample Date/Times match COC:

Yes

Custody Seal Intact:

Yes

VOA Vial Headspace ≥ 6mm:

165

Samples Chilled:

Yes

Total Trip Blank Qty:

N/A 0

Paperwork Enclosed:

Yes

Air Quality Samples Present:

No

Samples Intact:

Yes

Missing Samples:

No No

Extra Samples:

No

Unpacked by Simon Nies (25112) at 17:04 on 05/23/2018

Discrepancy in Container Qty on COC:

Samples Chilled Details

Thermometer Types:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler#	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT42-02	1.9	DT	Wet	Υ	Bagged	N
2	DT42-02	5.4	DT	Wet	Υ	Bagged	N



### **Explanation of Symbols and Abbreviations**

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	mg	milligram(s)				
С	degrees Celsius	mL	milliliter(s)				
cfu	colony forming units	MPN	Most Probable Number				
<b>CP Units</b>	cobalt-chloroplatinate units	N.D.	non-detect				
F	degrees Fahrenheit	ng	nanogram(s)				
g	gram(s)	NTU	nephelometric turbidity units				
IU	International Units	pg/L	picogram/liter				
kg	kilogram(s)	RL	Reporting Limit				
L	liter(s)	TNTC	Too Numerous To Count				
lb.	pound(s)	μg	microgram(s)				
m3	cubic meter(s)	μL	microliter(s)				
meq	milliequivalents	umhos/cm	micromhos/cm				
<	less than						
>	greater than						
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.						
ppb	parts per billion						
Dry weight basis			oisture content. This increases the analyte weight ample without moisture. All other results are reported on an				

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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### **Data Qualifiers**

Qualifier	Definition
С	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
Р	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised
	due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.









#### **ANALYSIS REPORT**

Prepared by:

Prepared for:

Eurofins Lancaster Laboratories Environmental 2425 New Holland Pike Lancaster, PA 17601 AECOM Suite 150 12420 Milestone Center Drive Germantown MD 20876

Report Date: July 12, 2018 16:08

Project: Fresno Phase II

Account #: 42343 Group Number: 1961420 SDG: FSB26 PO Number: 93872 State of Sample Origin: AR

To view our laboratory's current scopes of accreditation please go to <a href="http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/">http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/</a>. Historical copies may be requested through your project manager.

Electronic Copy To AECOM Electronic Copy To AECOM Electronic Copy To AECOM Attn: Todd Church Attn: Naoum Tavantzis Attn: Mike Myers

Respectfully Submitted,

Lay How

Kay Hower

(717) 556-7364









#### **SAMPLE INFORMATION**

Client Sample Description	Sample Collection Date/Time	ELLE#
FR-EB-Rope-062618 Water	06/26/2018 11:10	9686219
FR-EB-Pump-062618 Water	06/26/2018 11:15	9686220
FR-EB-Sounder-062618 Water	06/26/2018 11:20	9686221
FR-EB-Tube-062618 Water	06/26/2018 11:25	9686222
FR-145-MW01D Water	06/26/2018 11:20	9686223
FR-145-MW01 Water	06/26/2018 11:20	9686224
FR-MWBP-09C Water	06/27/2018 09:09	9686225
FR-HFMW-46B Water	06/27/2018 12:00	9686226
FR-FTA-MW01 Water	06/29/2018 08:20	9686227
FR-FTA-MW01 MS Water	06/29/2018 08:20	9686228
FR-FTA-MW01 MSD Water	06/29/2018 08:20	9686229
FR-100-MW01 Water	06/29/2018 10:18	9686230
FR-FRB-1-062918 Water	06/29/2018 10:30	9686231
FR-OF4-SD01 Soil	06/29/2018 11:26	9686232
FR-OF4-SD01D Soil	06/29/2018 11:26	9686233
FR-OF1-SD01 Soil	06/29/2018 11:48	9686234
FR-OF1-SD01 MS Soil	06/29/2018 11:48	9686235
FR-OF1-SD01 MSD Soil	06/29/2018 11:48	9686236

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.





Project Name: Fresno Phase II ELLE Group #: 1961420

#### **General Comments:**

All analyses have been performed in accordance with DOD QSM Version 5.0 unless otherwise noted below.

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.

Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

#### **Analysis Specific Comments:**

#### EPA 537 mod QSM 5.1 table B-15, LC/MS/MS Miscellaneous

Sample #s: 9686227, 9686228, 9686229, 9686235

The following analytes were manually integrated due to incorrect integrations: Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686232, 9686236

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorobutanesulfonate, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686225, 9686226, 9686233, 9686234

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686230

The following analytes were manually integrated due to incorrect integrations:
Perfluorooctanoic acid, Perfluoronanoic acid, Perfluorobutanesulfonate,
Perfluoro-octanesulfonate

Sample #s: 9686219, 9686220, 9686221, 9686222

The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorononanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

Sample #s: 9686223, 9686224

Reporting limits were raised due to interference from the sample matrix.



### Case Narrative

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The following analytes were manually integrated due to incorrect integrations: Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

#### Batch #: 18184008 (Sample number(s): 9686219-9686231 UNSPK: 9686227)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorobutanesulfonate, Perfluorooctanoic acid, Perfluorohexanesulfonate, Perfluoro-octanesulfonate

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Perfluorooctanoic acid, Perfluoroheptanoic a

#### Batch #: 18191003 (Sample number(s): 9686232-9686236 UNSPK: 9686234)

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: Perfluorobutanesulfonate

#### SM 2540 G-1997 %Moisture Calc, Wet Chemistry

#### Batch #: 18184820002B (Sample number(s): 9686232-9686233 BKG: 9686234)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture

#### Batch #: 18186820004A (Sample number(s): 9686234-9686236 BKG: 9686234)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Moisture, Moisture, Moisture Duplicate



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Sample Description: FR-EB-Rope-062618 Water

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/26/2018 11:10
SDG#: FSB26-01EB

**AECOM** 

ELLE Sample #: WW 9686219 ELLE Group #: 1961420

Matrix: Water

CAT No. LC/MS	Analysis Name /MS Miscellaneous EPA 537 m table B-15	CAS Number od QSM 5.1	Result ng/l	Detection Limit* ng/I	Limit of Detection ng/l	Limit of Quantitation ng/l	DF
14434	Perfluorobutanesulfonate	375-73-5	3.9	0.30	1.1	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	1.5 J	0.30	1.2	2.0	1
14434	Perfluorohexanesulfonate	355-46-4	9.5	0.40	1.1	2.0	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	6.8	0.60	2.3	3.0	1
14434	Perfluorooctanoic acid	335-67-1	2.3	0.30	1.2	2.0	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 19:05	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1



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Sample Description: FR-EB-Pump-062618 Water

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/26/2018 11:15
SDG#: FSB26-02EB

**AECOM** 

ELLE Sample #: WW 9686220 ELLE Group #: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 537 table B-1	<del>-</del> -	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	4.2	0.26	0.94	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	1.8	0.26	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	9.9	0.34	0.94	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	8.3	0.51	2.0	2.6	1
14434	Perfluorooctanoic acid	335-67-1	2.8	0.26	1.0	1.7	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 19:21	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1



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Sample Description: FR-EB-Sounder-062618 Water

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/26/2018 11:20
SDG#: FSB26-03EB

**AECOM** 

ELLE Sample #: WW 9686221 ELLE Group #: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 537 m table B-15	od QSM 5.1	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	4.0	0.27	0.98	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	1.7 J	0.27	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	9.4	0.36	0.98	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	7.5	0.53	2.0	2.7	1
14434	Perfluorooctanoic acid	335-67-1	2.1	0.27	1.1	1.8	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 19:36	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1



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**Sample Description:** FR-EB-Tube-062618 Water

Fresno ANG PFC SI

**Project Name:** Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10 Collection Date/Time: 06/26/2018 11:25 SDG#: FSB26-04EB

**AECOM** 

ELLE Sample #: WW 9686222 **ELLE Group #:** 1961420

Matrix:	Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	4.0	0.27	0.97	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	1.5 J	0.27	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	9.3	0.35	0.97	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	7.4	0.53	2.0	2.7	1
14434	Perfluorooctanoic acid	335-67-1	2.0	0.27	1.1	1.8	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 20:07	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1



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**Sample Description:** FR-145-MW01D Water

Fresno ANG PFC SI

**Project Name:** Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10 Collection Date/Time: 06/26/2018 11:20 SDG#: FSB26-05FD

**AECOM** 

ELLE Sample #: WW 9686223 **ELLE Group #**: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 537 n		ng/l	ng/l	ng/l	ng/l	
	table B-15						
14434	Perfluorobutanesulfonate	375-73-5	3,400	25	93	170	100
14434	Perfluoroheptanoic acid	375-85-9	300	2.5	10	17	10
14434	Perfluorohexanesulfonate	355-46-4	1,300	3.4	9.3	17	10
14434	Perfluorononanoic acid	375-95-1	N.D.	3.4	10	17	10
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	5.1	20	25	10
14434	Perfluorooctanoic acid	335-67-1	11 J	2.5	10	17	10
Repo	rting limits were raised due to interference	e from the sample	matrix.				

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory	Sample	Analysis	Record
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CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 13:26	Marissa C Drexinger	10
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 13:42	Marissa C Drexinger	100
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-145-MW01 Water

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10 Collection Date/Time: 06/26/2018 11:20

SDG#: FSB26-06

**AECOM** 

ELLE Sample #: WW 9686224 ELLE Group #: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF			
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1			ng/l	ng/l	ng/l	ng/l				
	table B-15									
14434	Perfluorobutanesulfonate	375-73-5	4,500	30	110	200	100			
14434	Perfluoroheptanoic acid	375-85-9	370	3.0	12	20	10			
14434	Perfluorohexanesulfonate	355-46-4	1,600	4.0	11	20	10			
14434	Perfluorononanoic acid	375-95-1	N.D.	4.0	12	20	10			
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	6.0	23	30	10			
14434	Perfluorooctanoic acid	335-67-1	13 J	3.0	12	20	10			
Repo	Reporting limits were raised due to interference from the sample matrix.									

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 13:57	Marissa C Drexinger	10
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 14:13	Marissa C Drexinger	100
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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**Sample Description:** FR-MWBP-09C Water

Fresno ANG PFC SI

**Project Name:** Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10 Collection Date/Time: 06/27/2018 09:09

SDG#: FSB26-07 **AECOM** 

ELLE Sample #: WW 9686225 1961420

**ELLE Group #**:

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	8.2	0.28	1.0	1.9	1
14434	Perfluoroheptanoic acid	375-85-9	6.4	0.28	1.1	1.9	1
14434	Perfluorohexanesulfonate	355-46-4	25	0.37	1.0	1.9	1
14434	Perfluorononanoic acid	375-95-1	1.4 J	0.37	1.1	1.9	1
14434	Perfluoro-octanesulfonate	1763-23-1	58	0.56	2.1	2.8	1
14434	Perfluorooctanoic acid	335-67-1	14	0.28	1.1	1.9	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 20:54	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1



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**Sample Description:** FR-HFMW-46B Water

Fresno ANG PFC SI

**Project Name:** Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10 Collection Date/Time: 06/27/2018 12:00

SDG#: FSB26-08 **AECOM** 

ELLE Sample #: WW 9686226 **ELLE Group #**: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/	MS Miscellaneous EPA 537 m/ table B-15	od QSW 5.1	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	7.3	0.30	1.1	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	1.8 J	0.30	1.2	2.0	1
14434	Perfluorohexanesulfonate	355-46-4	6.7	0.40	1.1	2.0	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	26	0.60	2.3	3.0	1
14434	Perfluorooctanoic acid	335-67-1	2.3	0.30	1.2	2.0	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 21:10	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1



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Sample Description: FR-FTA-MW01 Water

Fresno ANG PFC SI

Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/29/2018 08:20
SDG#: FSB26-09BKG

**Project Name:** 

**AECOM** 

ELLE Sample #: WW 9686227

ELLE Group #: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	MS Miscellaneous EPA 537 m/ table B-15	100 QSW 5.1	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	120	0.30	1.1	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	590	3.0	12	20	10
14434	Perfluorohexanesulfonate	355-46-4	1,300	4.0	11	20	10
14434	Perfluorononanoic acid	375-95-1	0.75 J	0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	10	0.60	2.3	3.0	1
14434	Perfluorooctanoic acid	335-67-1	170	0.30	1.2	2.0	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 21:25	Joshua P Trost	1
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/09/2018 14:28	Marissa C Drexinger	10
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-FTA-MW01 MS Water

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/29/2018 08:20
SDG#: FSB26-09MS

**AECOM** 

ELLE Sample #: WW 9686228 ELLE Group #: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result		Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table i		ng/l		ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	130		0.30	1.1	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	450	E	0.30	1.2	2.0	1
14434	Perfluorohexanesulfonate	355-46-4	1,400	E	0.40	1.1	2.0	1
14434	Perfluorononanoic acid	375-95-1	5.2		0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	18		0.60	2.3	3.0	1
14434	Perfluorooctanoic acid	335-67-1	180		0.30	1.2	2.0	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 21:41	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1



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Sample Description: FR-FTA-MW01 MSD Water

Fresno ANG PFC SI

Project Name: Fresno Phase II

 Submittal Date/Time:
 06/30/2018 10:10

 Collection Date/Time:
 06/29/2018 08:20

 SDG#:
 FSB26-09MSD

**AECOM** 

ELLE Sample #: WW 9686229 ELLE Group #: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result		Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	MS Miscellaneous EPA 537 m/ table B-15	od QSM 5.1	ng/l		ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	130		0.30	1.1	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	440	E	0.30	1.2	2.0	1
14434	Perfluorohexanesulfonate	355-46-4	1,300	E	0.40	1.1	2.0	1
14434	Perfluorononanoic acid	375-95-1	4.9		0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	15		0.59	2.3	3.0	1
14434	Perfluorooctanoic acid	335-67-1	170		0.30	1.2	2.0	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 21:56	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-100-MW01 Water

Fresno ANG PFC SI

Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10 Collection Date/Time: 06/29/2018 10:18

SDG#: FSB26-10

**Project Name:** 

**AECOM** 

ELLE Sample #: WW 9686230 ELLE Group #: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS/		EPA 537 mod QSM 5.1 table B-15	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	1.6 J	0.30	1.1	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	3.4	0.30	1.2	2.0	1
14434	Perfluorohexanesulfonate	355-46-4	75	0.40	1.1	2.0	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.40	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	8.4	0.60	2.3	3.0	1
14434	Perfluorooctanoic acid	335-67-1	130	0.30	1.2	2.0	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 22:12	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1



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Sample Description: FR-FRB-1-062918 Water

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/29/2018 10:30
SDG#: FSB26-11FB

**AECOM** 

ELLE Sample #: WW 9686231

ELLE Group #: 1961420

Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Detection Limit*	Limit of Detection	Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 537 m table B-15	od QSM 5.1	ng/l	ng/l	ng/l	ng/l	
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.97	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.27	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.97	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.53	2.0	2.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.27	1.1	1.8	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/06/2018 22:27	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18184008	07/03/2018 07:50	Courtney J Fatta	1

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-OF4-SD01 Soil

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10 Collection Date/Time: 06/29/2018 11:26

SDG#: FSB26-12

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ELLE Sample #: SW 9686232 ELLE Group #: 1961420

Matrix: Soil

analysis Name	CAS Number	Dry Result	Limit*	Limit of Detection	Limit of Quantitation	DF
		ng/g	ng/g	ng/g	ng/g	
Perfluorobutanesulfonate	375-73-5	0.45 J	0.19	0.57	0.76	1
erfluoroheptanoic acid	375-85-9	0.57 J	0.19	0.65	0.76	1
Perfluorohexanesulfonate	355-46-4	1.3	0.19	0.61	0.76	1
erfluorononanoic acid	375-95-1	1.0	0.19	0.65	0.76	1
erfluoro-octanesulfonate	1763-23-1	16	0.19	0.62	0.76	1
Perfluorooctanoic acid	335-67-1	0.71 J	0.19	0.65	0.76	1
		%	%	%	%	
1oisture	n.a.	4.3	0.50	0.50	0.50	1
	erfluorobutanesulfonate erfluoroheptanoic acid erfluorohexanesulfonate erfluorononanoic acid erfluoro-octanesulfonate erfluorococtanoic acid  mistry  SM %Milloisture	erfluoroheptanoic acid 375-85-9 erfluorohexanesulfonate 355-46-4 erfluorononanoic acid 375-95-1 erfluoro-octanesulfonate 1763-23-1 erfluoroctanoic acid 335-67-1  mistry SM 2540 G-1997 %Moisture Calc loisture n.a.	table B-15         erfluorobutanesulfonate       375-73-5       0.45 J         erfluoroheptanoic acid       375-85-9       0.57 J         erfluorohexanesulfonate       355-46-4       1.3         erfluorononanoic acid       375-95-1       1.0         erfluoro-octanesulfonate       1763-23-1       16         erfluoroctanoic acid       335-67-1       0.71 J         mistry       SM 2540 G-1997       %         %Moisture Calc         loisture       n.a.       4.3	table B-15         erfluorobutanesulfonate       375-73-5       0.45 J       0.19         erfluoroheptanoic acid       375-85-9       0.57 J       0.19         erfluorohexanesulfonate       355-46-4       1.3       0.19         erfluorononanoic acid       375-95-1       1.0       0.19         erfluoro-octanesulfonate       1763-23-1       16       0.19         erfluorooctanoic acid       335-67-1       0.71 J       0.19         mistry       SM 2540 G-1997       %       %         %Moisture Calc	table B-15         erfluorobutanesulfonate       375-73-5       0.45 J       0.19       0.57         erfluoroheptanoic acid       375-85-9       0.57 J       0.19       0.65         erfluorohexanesulfonate       355-46-4       1.3       0.19       0.61         erfluorononanoic acid       375-95-1       1.0       0.19       0.65         erfluoro-octanesulfonate       1763-23-1       16       0.19       0.62         erfluorocotanoic acid       335-67-1       0.71 J       0.19       0.65         mistry       SM 2540 G-1997       %       %       %         Moisture Calc         loisture       n.a.       4.3       0.50       0.50	table B-15       erfluorobutanesulfonate     375-73-5     0.45 J     0.19     0.57     0.76       erfluoroheptanoic acid     375-85-9     0.57 J     0.19     0.65     0.76       erfluorohexanesulfonate     355-46-4     1.3     0.19     0.61     0.76       erfluorononanoic acid     375-95-1     1.0     0.19     0.65     0.76       erfluoro-octanesulfonate     1763-23-1     16     0.19     0.62     0.76       erfluoroctanoic acid     335-67-1     0.71 J     0.19     0.65     0.76       mistry     SM 2540 G-1997     %     %     %       Moisture     n.a.     4.3     0.50     0.50     0.50

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst Date and Time** No. **Factor** 14478 EPA 537 mod QSM 5.1 PFAS in Soil by LC/MS/MS-DoD 1 18191003 07/12/2018 02:20 Joshua P Trost table B-15 PFAS Solid Prep - DoD EPA 537 mod QSM 5.1 18191003 07/10/2018 09:10 Courtney J Fatta 1 14510 table B-15 SM 2540 G-1997 18184820002B 07/03/2018 09:52 William C Schwebel 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-OF4-SD01D Soil

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/29/2018 11:26
SDG#: FSB26-13FD

**AECOM** 

ELLE Sample #: SW 9686233 ELLE Group #: 1961420

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous E ta	PA 537 mod QSM 5.1 ible B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	0.63 J	0.21	0.62	0.82	1
14478	Perfluoroheptanoic acid	375-85-9	0.75 J	0.21	0.70	0.82	1
14478	Perfluorohexanesulfonate	355-46-4	1.2	0.21	0.66	0.82	1
14478	Perfluorononanoic acid	375-95-1	2.1	0.21	0.70	0.82	1
14478	Perfluoro-octanesulfonate	1763-23-1	18	0.21	0.67	0.82	1
14478	Perfluorooctanoic acid	335-67-1	0.92	0.21	0.70	0.82	1
Wet CI		M 2540 G-1997 Moisture Calc	%	%	%	%	
00111	Moisture	n.a.	4.4	0.50	0.50	0.50	1
		s in weight of the sample after The moisture result reported i					

as-received basis.

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst Date and Time** No. **Factor** EPA 537 mod QSM 5.1 07/12/2018 02:36 14478 PFAS in Soil by LC/MS/MS-DoD 1 18191003 Joshua P Trost table B-15 PFAS Solid Prep - DoD Courtney J Fatta EPA 537 mod QSM 5.1 18191003 07/10/2018 09:10 1 14510 table B-15 SM 2540 G-1997 18184820002B 07/03/2018 09:52 William C Schwebel 00111 Moisture %Moisture Calc

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-OF1-SD01 Soil

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/29/2018 11:48
SDG#: FSB26-14BKG

**AECOM** 

ELLE Sample #: SW 9686234 ELLE Group #: 1961420

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table E		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	N.D.	0.19	0.57	0.76	1
14478	Perfluoroheptanoic acid	375-85-9	N.D.	0.19	0.65	0.76	1
14478	Perfluorohexanesulfonate	355-46-4	0.40 J	0.19	0.61	0.76	1
14478	Perfluorononanoic acid	375-95-1	N.D.	0.19	0.65	0.76	1
14478	Perfluoro-octanesulfonate	1763-23-1	4.1	0.19	0.62	0.76	1
14478	Perfluorooctanoic acid	335-67-1	0.40 J	0.19	0.65	0.76	1
Wet CI		40 G-1997 sture Calc	%	%	%	%	
00111	Moisture	n.a.	1.3	0.50	0.50	0.50	1
	Moisture represents the loss in we 103 - 105 degrees Celsius. The mas-received basis.						

### Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### **Laboratory Sample Analysis Record** Method Dilution CAT **Analysis Name** Trial# Batch# **Analysis Analyst** Date and Time No. **Factor** EPA 537 mod QSM 5.1 14478 PFAS in Soil by LC/MS/MS-DoD 1 18191003 07/12/2018 03:07 Joshua P Trost table B-15 PFAS Solid Prep - DoD 18191003 EPA 537 mod QSM 5.1 07/10/2018 09:10 Courtney J Fatta 1 14510 table B-15 SM 2540 G-1997 2 18186820004A 07/05/2018 11:42 Larry E Bevins 00111 Moisture %Moisture Calc



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Sample Description: FR-OF1-SD01 MS Soil

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/29/2018 11:48
SDG#: FSB26-14MS

**AECOM** 

ELLE Sample #: SW 9686235 ELLE Group #: 1961420

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS		EPA 537 mod QSM 5.1 able B-15	ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.3	0.20	0.59	0.79	1
14478	Perfluoroheptanoic acid	375-85-9	1.5	0.20	0.67	0.79	1
14478	Perfluorohexanesulfonate	355-46-4	1.8	0.20	0.63	0.79	1
14478	Perfluorononanoic acid	375-95-1	1.6	0.20	0.67	0.79	1
14478	Perfluoro-octanesulfonate	1763-23-1	5.6	0.20	0.64	0.79	1
14478	Perfluorooctanoic acid	335-67-1	1.9	0.20	0.67	0.79	1
Wet Ch		SM 2540 G-1997 %Moisture Calc	%	%	%	%	
00118	Moisture	n.a.	1.3	0.50	0.50	0.50	1

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

	Laboratory Sample Analysis Record										
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor				
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18191003	07/12/2018 03:23	Joshua P Trost	1				
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	2	18191003	07/10/2018 09:10	Courtney J Fatta	1				
00118	Moisture	SM 2540 G-1997 %Moisture Calc	2	18186820004A	07/05/2018 11:42	Larry E Bevins	1				

<sup>\*=</sup>This limit was used in the evaluation of the final result



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Sample Description: FR-OF1-SD01 MSD Soil

Fresno ANG PFC SI

Project Name: Fresno Phase II

Submittal Date/Time: 06/30/2018 10:10
Collection Date/Time: 06/29/2018 11:48
SDG#: FSB26-14MSD

**AECOM** 

ELLE Sample #: SW 9686236 ELLE Group #: 1961420

Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Detection Limit*	Dry Limit of Detection	Dry Limit of Quantitation	DF
LC/MS	/MS Miscellaneous EPA 5 table l		ng/g	ng/g	ng/g	ng/g	
14478	Perfluorobutanesulfonate	375-73-5	1.6	0.19	0.57	0.76	1
14478	Perfluoroheptanoic acid	375-85-9	1.5	0.19	0.65	0.76	1
14478	Perfluorohexanesulfonate	355-46-4	1.8	0.19	0.61	0.76	1
14478	Perfluorononanoic acid	375-95-1	1.5	0.19	0.65	0.76	1
14478	Perfluoro-octanesulfonate	1763-23-1	5.0	0.19	0.62	0.76	1
14478	Perfluorooctanoic acid	335-67-1	1.9	0.19	0.65	0.76	1
Wet C	nemistry SM 25	40 G-1997	%	%	%	%	
	%Mois	sture Calc					
00118	Moisture	n.a.	1.3	0.50	0.50	0.50	1
00121	Moisture Duplicate	n.a.	1.5	0.50	0.50	0.50	1
	The duplicate moisture value is pr moisture test. For comparability p determination is the value used to	ourposes, the initial moi	sture				

#### **Sample Comments**

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14478	PFAS in Soil by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18191003	07/12/2018 03:38	Joshua P Trost	1
14510	PFAS Solid Prep - DoD	EPA 537 mod QSM 5.1 table B-15	2	18191003	07/10/2018 09:10	Courtney J Fatta	1
00118	Moisture	SM 2540 G-1997 %Moisture Calc	2	18186820004A	07/05/2018 11:42	Larry E Bevins	1
00121	Moisture Duplicate	SM 2540 G-1997 %Moisture Calc	2	18186820004A	07/05/2018 11:42	Larry E Bevins	1

<sup>\*=</sup>This limit was used in the evaluation of the final result

### **Quality Control Summary**

Client Name: AECOM Group Number: 1961420

Reported: 07/12/2018 16:08

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### **Method Blank**

Analysis Name	Result	DL**	LOD	LOQ
	ng/g	ng/g	ng/g	ng/g
Batch number: 18191003	Sample num	ber(s): 968623	2-9686236	
Perfluorobutanesulfonate	N.D.	0.20	0.60	0.80
Perfluoroheptanoic acid	N.D.	0.20	0.68	0.80
Perfluorohexanesulfonate	N.D.	0.20	0.64	0.80
Perfluorononanoic acid	N.D.	0.20	0.68	0.80
Perfluoro-octanesulfonate	N.D.	0.20	0.65	0.80
Perfluorooctanoic acid	N.D.	0.20	0.68	0.80
	ng/l	ng/l	ng/l	ng/l
Batch number: 18184008	Sample num	ber(s): 968621	9-9686231	
Perfluorobutanesulfonate	N.D.	0.30	1.1	2.0
Perfluoroheptanoic acid	N.D.	0.30	1.2	2.0
Perfluorohexanesulfonate	N.D.	0.40	1.1	2.0
Perfluorononanoic acid	N.D.	0.40	1.2	2.0
Perfluoro-octanesulfonate	N.D.	0.60	2.3	3.0
Perfluorooctanoic acid	N.D.	0.30	1.2	2.0

#### LCS/LCSD

Analysis Name	LCS Spike Added ng/g	LCS Conc ng/g	LCSD Spike Added ng/g	LCSD Conc ng/g	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18191003	Sample number(	s): 9686232-9	9686236						
Perfluorobutanesulfonate	1.20	1.24			103		70-130		
Perfluoroheptanoic acid	1.36	1.45			107		70-130		
Perfluorohexanesulfonate	1.29	1.33			103		70-130		
Perfluorononanoic acid	1.36	1.40			103		70-130		
Perfluoro-octanesulfonate	1.30	1.31			101		70-130		
Perfluorooctanoic acid	1.36	1.45			106		70-130		
	ng/l	ng/l	ng/l	ng/l					
Batch number: 18184008	Sample number(	s): 9686219-9	9686231						
Perfluorobutanesulfonate	4.81	4.60			96		72-127		
Perfluoroheptanoic acid	5.44	4.84			89		75-139		
Perfluorohexanesulfonate	5.14	4.66			91		71-130		
Perfluorononanoic acid	5.44	4.55			84		73-144		
Perfluoro-octanesulfonate	5.20	4.36			84		67-134		

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

### **Quality Control Summary**

Client Name: AECOM Group Number: 1961420

Reported: 07/12/2018 16:08

#### LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorooctanoic acid	5.44	5.35			98		76-136		
	%	%	%	%					
Batch number: 18184820002B	Sample number(	s): 9686232-9	0686233						
Moisture	89.5	89.39			100		99-101		
Batch number: 18186820004A	Sample number(	s): 9686234-9	686236						
Moisture	89.5	89.43			100		99-101		
Moisture	89.5	89.43			100		99-101		
Moisture Duplicate	89.5	89.43			100		99-101		

#### MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/g	MS Spike Added ng/g	MS Conc ng/g	MSD Spike Added ng/g	MSD Conc ng/g	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 18191003	Sample numbe	er(s): 9686232-	9686236 U	NSPK: 9686234						
Perfluorobutanesulfonate	N.D.	1.17	1.27	1.13	1.53	109	135*	70-130	19	30
Perfluoroheptanoic acid	N.D.	1.32	1.48	1.28	1.48	112	116	70-130	0	30
Perfluorohexanesulfonate	0.394	1.25	1.76	1.21	1.75	109	112	70-130	0	30
Perfluorononanoic acid	N.D.	1.32	1.54	1.28	1.45	117	113	70-130	6	30
Perfluoro-octanesulfonate	4.01	1.26	5.58	1.23	4.94	124	76	70-130	12	30
Perfluorooctanoic acid	0.396	1.32	1.91	1.28	1.87	115	115	70-130	2	30
	ng/l	ng/l	ng/l	ng/l	ng/l					
Batch number: 18184008	Sample numbe	er(s): 9686219-	9686231 U	NSPK: 9686227	•					
Perfluorobutanesulfonate	124.67	4.79	133.12	4.75	132.49	177 (2)	164 (2)	72-127	0	30
Perfluoroheptanoic acid	589.31	5.41	448.7	5.37	440.64	-2598 (2)	-2766 (2)	75-139	2	30
Perfluorohexanesulfonate	1348.37	5.12	1367.64	5.08	1321.64	377 (2)	-525 (2)	71-130	3	30
Perfluorononanoic acid	0.749	5.41	5.20	5.37	4.91	82	77	73-144	6	30
Perfluoro-octanesulfonate	10.27	5.17	17.81	5.14	15.19	146*	96	67-134	16	30
Perfluorooctanoic acid	165.26	5.41	176.01	5.37	167.36	199 (2)	39 (2)	76-136	5	30

#### **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

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### **Quality Control Summary**

Client Name: AECOM Group Number: 1961420

Reported: 07/12/2018 16:08

#### **Laboratory Duplicate**

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max
	%	%		
Batch number: 18184820002B	Sample number(s): 9686	6232-9686233 BKG: 96	86234	
Moisture	1.19	1.48	22* (1)	5
Batch number: 18186820004A	Sample number(s): 9686	6234-9686236 BKG: 96	86234	
Moisture	1.34	1.54	14* (1)	5
Moisture	1.34	1.54	14* (1)	5
Moisture Duplicate	1.34	1.54	14* (1)	5

#### **Surrogate Quality Control**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS-DoD

Batch number: 18184008

	13C3-F	PFBS	13C3-F	PFHxS	13C4-F	PFHpA	13C8-P	PFOA	13C8-P	FOS	13C9-P	PFNA
	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD	%Rec	LOD
		(ng/l)		(ng/l)		(ng/l)		(ng/l)		(ng/l)		(ng/l)
9686219	123	10	73	10	93	2.0	94	2.0	109	10	148	2.0
9686220	93	8.5	80	8.5	86	1.7	90	1.7	86	8.5	110	1.7
9686221	97	8.9	87	8.9	91	1.8	96	1.8	97	8.9	121	1.8
9686222	90	8.8	82	8.8	91	1.8	91	1.8	92	8.8	112	1.8
9686223	66	85 (3)	84	85 (3)	83	17 (3)	88	17 (3)	90	85 (3)	101	17 (3)
9686224	67	100 (3)	83	100 (3)	83	20	92	20	98	100 (3)	99	20
9686225	102	9.3	95	9.3	96	1.9	104	1.9	101	9.3	118	1.9
9686226	100	10	79	10	87	2.0	108	2.0	108	10	129	2.0
9686227	101	10	53	10	56	2.0	94	2.0	99	10	120	2.0
9686228	98	9.9	51	9.9	53	2.0	89	2.0	98	9.9	124	2.0
9686229	98	9.9	52	9.9	53	2.0	91	2.0	98	9.9	125	2.0
9686230	80	10	55	10	64	2.0	78	2.0	79	10	104	2.0
9686231	101	8.8	80	8.8	88	1.8	102	1.8	109	8.8	143	1.8
Blank	81	10	78	10	78	2.0	83	2.0	89	10	98	2.0
LCS	91	10	88	10	92	2.0	97	2.0	95	10	105	2.0
MS	98	9.9	51	9.9	53	2.0	89	2.0	98	9.9	124	2.0
MSD	98	9.9	52	9.9	53	2.0	91	2.0	98	9.9	125	2.0
Limits:	50-15	60	50-15	0	50-15	0	50-15	0	50-15	0	50-15	0

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18191003

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.



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### **Quality Control Summary**

Client Name: AECOM Group Number: 1961420

Reported: 07/12/2018 16:08

### **Surrogate Quality Control (continued)**

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Soil by LC/MS/MS-DoD

Batch number: 18191003

	13C3-I	PFBS	13C3-F	PFHxS	13C4-P	FHpA	13C8-P	PFOA	13C8-F	PFOS	13C9-P	FNA
	%Rec	LOD (ng/g)	%Rec	LOD (ng/g)	%Rec	LÓD (ng/g)	%Rec	LOD (ng/g)	%Rec	LOD (ng/g)	%Rec	LOD (ng/g)
9686232	80	0.55	72	0.55	74	0.55	72	0.55	78	0.82	94	0.36
9686233	74	0.59	74	0.59	71	0.59	75	0.59	75	0.88	88	0.39
9686234	66	0.57	63	0.57	53	0.57	57	0.57	71	0.85	64	0.38
9686235	74	0.58	74	0.58	53	0.58	58	0.58	77	0.87	65	0.39
9686236	70	0.57	70	0.57	55	0.57	57	0.57	70	0.85	59	0.38
Blank	73	1.2	71	1.2	70	1.2	76	1.2	71	1.8	72	0.80
LCS	75	1.2	75	1.2	71	1.2	74	1.2	73	1.8	71	0.80
MS	74	0.58	74	0.58	53	0.58	58	0.58	77	0.87	65	0.39
MSD	70	0.57	70	0.57	55	0.57	57	0.57	70	0.85	59	0.38
Limits:	50-15	0	50-15	0	50-15	0	50-15	0	50-15	0	50-15	0

<sup>\*-</sup> Outside of specification

<sup>\*\*-</sup>This limit was used in the evaluation of the final result for the blank

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

<sup>(2)</sup> The unspiked result was more than four times the spike added.

<sup>(3)</sup> The surrogate spike amount was less than the LOD.

# 42343 1961420 19686219-36

# **Chain of Custody**

**AECOM** 3101 Wilson Blvd Suite 900 A\_COM

Arlington, Virginia 22201

Phone No. (703) 682	-4900;	Fax N	Vo. (703 <sub>)</sub>	) 682-49	001													PAGE	OF
Laboratory A		****				Project Name				- ord Pin				Analys	is		Chair	of Custody No.	
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				<u> </u>	FR-EB-PLA				W	2	1	$\chi$							
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					FR-EB-TWL			1125	W	2.	1	X						<u>, , , , , , , , , , , , , , , , , , , </u>	
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100-MW01					FR-100 -		1		W	2	1	X							
FANG					FR-FRB.			1030	w	2_	1	X							
0F4-SDOI					FR-054-	SP01	No.	1126	S	2_	2	X							
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# 42343 | 1961420 | 9686219-36

# Chain of Custody

**AECOM** 

3101 Wilson Blvd Suite 900

Arlington, Virginia 22201

Phone No. (703) 682-4900; Fax No. (703) 682-4901

A=COM

Laboratory Chain of Custody No. Analysis Freque ANG PFC SI Batch May 16 Megan Cardenes 50 ERPIMS Information Other Sample Information SA Samp No. of Cooler LOCID SBD SED Sample I.D. Matrix Date Comment Code No Con. No. 0F2-500) FR-0 F1-5001 6/29/18/148 MS/MSD 1. Relinquished By / Company had Neptone AECOM 1. Received By / Company Date Time Feder 2. Relinquished By / Company Time 2. Received By / Company Date Time 3. Relinquished By / Company 3. Received By / Company Time Date Time Date 4. Relinquished By / Company-4. Received By Company Date Time 5. Relinquished By / Company Time 5. Received By / Company Date Comments



### Sample Administration Receipt Documentation Log

Doc Log ID:

220665

Group Number(s): 1961420

Client: AECOM

**Delivery and Receipt Information** 

Delivery Method:

Fed Ex

Arrival Timestamp:

06/30/2018 10:10

Number of Packages:

1

Number of Projects:

1

State/Province of Origin:

Environmental

VA

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

**Custody Seal Present:** 

Yes

Sample Date/Times match COC:

No

Custody Seal Intact:

Yes

VOA Vial Headspace ≥ 6mm:

N/A

Samples Chilled:

Yes

Total Trip Blank Qty:

0

Paperwork Enclosed:

Yes Yes

Air Quality Samples Present:

No

Samples Intact:

No

Missing Samples: Extra Samples:

Nο

Discrepancy in Container Qty on COC:

No

Unpacked by Raysa Perez (14020) at 14:18 on 06/30/2018

Samples Chilled Details

Thermometer Types:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler#

Thermometer ID DT146

Corrected Temp 1.0

Therm. Type

Ice Type

Ice Present?

Ice Container

**Elevated Temp?** 

DT

Wet

Bagged

Ν

Sample Date/Time Discrepancy Details

Comments

FR-EB-ROPE-062618

Date/Time on Label 6/26/2018 ---

FR-EB-PUMP-062618

Sample ID on COC

6/26/2018 ---

FR-EB-SOUNDER-062618

6/26/2018 ---

FR-EB-TUBE-062618

6/26/2018 --

FR-145-MW01D

6/26/2018 ---

FR-145-MW01

6/26/2018 --

FR-MWBP-09C FR-HFMW-46B

6/27/2018 ---6/27/2018 ---

FR-100-MW01 FR-FTA-MW01 6/29/2018 --

FR-FRB-1-062918

6/29/2018 ---6/29/2018 ---

FR-OF1-SD01

6/29/2018 ---



**BMQL** 

ppb

basis

Dry weight

parts per billion

as-received basis.

## **Explanation of Symbols and Abbreviations**

milliliter(s)

The following defines common symbols and abbreviations used in reporting technical data:

Below Minimum Quantitation Level

С	degrees Celsius	MPN	Most Probable Number
cfu	colony forming units	N.D.	non-detect
CP Units	cobalt-chloroplatinate units	ng	nanogram(s)
F	degrees Fahrenheit	NTU	nephelometric turbidity units
g	gram(s)	pg/L	picogram/liter
IU	International Units	RL	Reporting Limit
kg	kilogram(s)	TNTC	Too Numerous To Count
L	liter(s)	μg	microgram(s)
lb.	pound(s)	μL	microliter(s)
m3	cubic meter(s)	umhos/cm	micromhos/cm
meq	milliequivalents	MCL	Maximum Contamination Limit
mg	milligram(s)		
<	less than		
>	greater than		
ppm	aqueous liquids, ppm is usually taken	to be equivalent to milli	kilogram (mg/kg) or one gram per million grams. For grams per liter (mg/l), because one liter of water has a weight uivalent to one microliter per liter of gas.

mL

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Results printed under this heading have been adjusted for moisture content. This increases the analyte weight

concentration to approximate the value present in a similar sample without moisture. All other results are reported on an

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

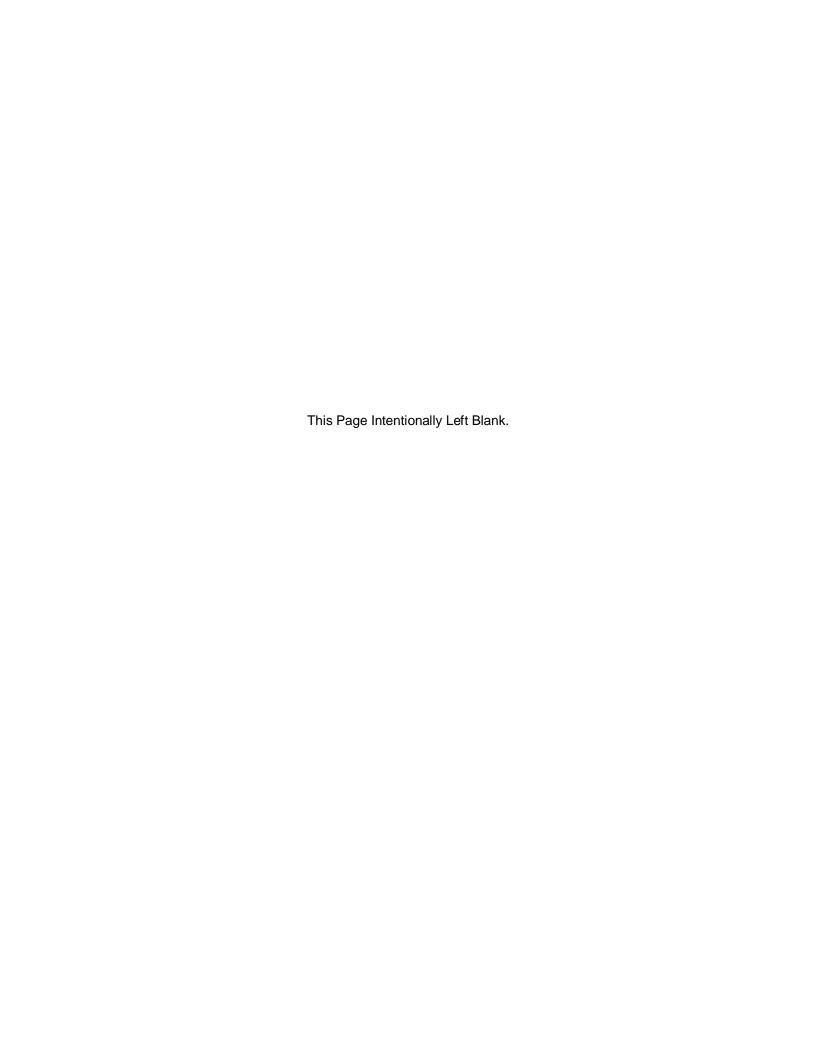
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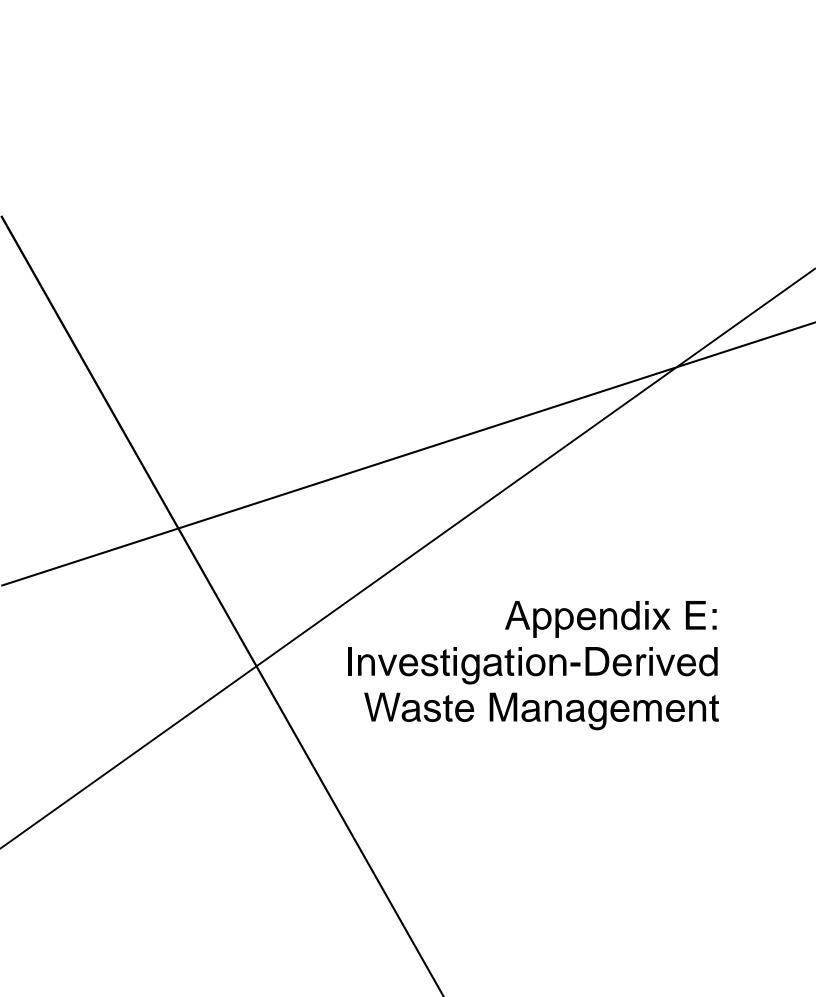


# **Data Qualifiers**

Qualifier	Definition
С	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
Р	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised
	due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.









## WASTE MATERIAL PROFILE SHEET

### Clean Harbors Profile No. CH1710875

A. GENERAL INFORMATION California Air National Guard GENERATOR NAME: GENERATOR EPA ID #/REGISTRATION # GENERATOR CODE (Assigned by Clean Harbors) STATE/PROVINCE Fresno CA ZIP/POSTAL CODE CA64340 93727 ADDRESS 5323 E McKinlev Avenue (Fresno ANGB) PHONE: (559) 454-5236 CUSTOMER CODE (Assigned by Clean Harbors) AE12881 CUSTOMER NAME: **AECOM** ADDRESS 12420 Milestone Dr Ste 150 CITY Germantown STATE/PROVINCE MD ZIP/POSTAL CODE 20876 **B. WASTE DESCRIPTION** WASTE DESCRIPTION: Soil w/ PFAS PROCESS GENERATING WASTE: Soil sampling IS THIS WASTE CONTAINED IN SMALL PACKAGING CONTAINED WITHIN A LARGER SHIPPING CONTAINER? C. PHYSICAL PROPERTIES (at 25C or 77F) PHYSICAL STATE NUMBER OF PHASES/LAYERS VISCOSITY (If liquid present) COLOR SOLID WITHOUT FREE LIQUID 1 - 100 (e.g. Water) 0.00 **POWDER** brown MIDDLE 101 - 500 (e.g. Motor Oil) 0.00 % BY VOLUME (Approx.) MONOLITHIC SOLID LIQUID WITH NO SOLIDS **BOTTOM** 501 - 10,000 (e.g. Molasses) 0.00 LIQUID/SOLID MIXTURE % FREE LIQUID **ODOR** % SETTLED SOLID TOTAL ORGANIC CARBON MELTING POINT °F (°C) BOILING POINT °F (°C) NONE % TOTAL SUSPENDED SOLID <= 95 (<=35) SLUDGE MILD < 140 (<60) <= 1% 95 - 100 (35-38) STRONG GAS/AEROSOL 140-200 (60-93) 1-9% 101 - 129 (38-54) Describe: ~ > 200 (>93) >= 10% >= 130 (>54) FLASH POINT °F (°C) SPECIFIC GRAVITY ASH BTU/LB (MJ/kg) pН < 0.8 (e.g. Gasoline) < 73 (<23) < 2,000 (<4.6) <= 2 < 0.1 > 20 0.8-1.0 (e.g. Ethanol) 73 - 100 (23-38) 2.1 - 6.9 2,000-5,000 (4.6-11.6) 0.1 - 1.0 Unknown 1.0 (e.g. Water) 101 -140 (38-60) 5,000-10,000 (11.6-23.2) 7 (Neutral) 1.1 - 5.0141 -200 (60-93) > 10,000 (>23.2) 7.1 - 12.4 1.0-1.2 (e.g. Antifreeze) 5.1 - 20.0 > 200 (>93) >= 12.5 > 1.2 (e.g. Methylene Chloride) Actual: D. COMPOSITION (List the complete composition of the waste, include any inert components and/or debris. Ranges for individual components are acceptable. If a trade name is used, CHEMICAL MIN MAX LIOM -- 500.0000000 PPM POLYFLUOROALKYL SUBSTANCES 0.0000000 SOIL 100.0000000 100.0000000 % DOES THIS WASTE CONTAIN ANY HEAVY GAUGE METAL DEBRIS OR OTHER LARGE OBJECTS (EX., METAL PLATE OR PIPING >1/4" THICK OR ✓ YES NO >12" LONG, METAL REINFORCED HOSE >12" LONG, METAL WIRE >12" LONG, METAL VALVES, PIPE FITTINGS, CONCRETE REINFORCING BAR OR PIECES OF CONCRETE >3")? If yes, describe, including dimensions: DOES THIS WASTE CONTAIN ANY METALS IN POWDERED OR OTHER FINELY DIVIDED FORM? V YES NO DOES THIS WASTE CONTAIN OR HAS IT CONTACTED ANY OF THE FOLLOWING; ANIMAL WASTES, HUMAN BLOOD, BLOOD PRODUCTS, BODY ~ YES NO FLUIDS, MICROBIOLOGICAL WASTE, PATHOLOGICAL WASTE, HUMAN OR ANIMAL DERIVED SERUMS OR PROTEINS OR ANY OTHER POTENTIALLY INFECTIOUS MATERIAL?

Chemical disinfection or some other form of sterilization has been applied to the waste.

I ACKNOWLEDGE THAT THIS PROFILE MEETS THE CLEAN HARBORS BATTERY PACKAGING REQUIREMENTS.

I ACKNOWLEDGE THAT MY FRIABLE ASBESTOS WASTE IS DOUBLE BAGGED AND WETTED.

SPECIFY THE SOURCE CODE ASSOCIATED WITH THE G39 SPECIFY THE FORM CODE ASSOCIATED WITH THE WASTE.

W301
WASTE.

I acknowledge that this waste material is neither infectious nor does it contain any organism known to be a threat to human health. This certification is

based on my knowledge of the material. Select the answer below that applies:

The waste was never exposed to potentially infectious material.

YES

NO

NO

NO

NO



#### **E. CONSTITUENTS**

Are these values based on testing or knowledge?

Knowledge V Testing

If constituent concentrations are based on analytical testing, analysis must be provided. Please attach document(s) using the link on the Submit tab.

Please indicate which constituents below apply. Concentrations must be entered when applicable to assist in accurate review and expedited approval of your waste profile. Please note that the total regulated metals and other constituents sections require answers.

5.0 100.0 1.0 5.0 5.0 0.2 1.0 5.0 0.5 100.0 6.0 0.5 0.7 200.0 0.7 0.5		OTHER CONSTITUENTS BROMINE CHLORINE FLUORINE IODINE		V V V V	UOM	NC APPLIC	CABLE
1.0 5.0 5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 0.5 0.7 200.0 0.7		BROMINE CHLORINE FLUORINE			UOM	APPLIC	CABLE
5.0 5.0 0.2 1.0 5.0 0.5 100.0 6.0 0.5 0.7 200.0 0.7		BROMINE CHLORINE FLUORINE			UOM	APPLIC	CABLE
5.0 0.2 1.0 5.0 0.5 0.5 100.0 6.0 0.5 0.7 200.0		BROMINE CHLORINE FLUORINE		V V V	UOM	APPLIC	CABLE
0.2 1.0 5.0 0.5 0.5 100.0 6.0 0.5 0.7 200.0		BROMINE CHLORINE FLUORINE		V V	UOM	APPLIC	CABLE
1.0 5.0 0.5 0.5 100.0 6.0 0.5 0.7 200.0		BROMINE CHLORINE FLUORINE		<b>V</b>	UOM	APPLIC	CABLE
5.0 0.5 0.5 100.0 6.0 0.5 0.7 200.0 0.7		BROMINE CHLORINE FLUORINE		<u> </u>	UOM	APPLIC	CABLE
0.5 0.5 100.0 6.0 0.5 0.7 200.0		BROMINE CHLORINE FLUORINE			UOM	APPLIC	CABLE
0.5 100.0 6.0 0.5 0.7 200.0		BROMINE CHLORINE FLUORINE		MAX	UOM	APPLIC	CABLE
0.5 100.0 6.0 0.5 0.7 200.0		BROMINE CHLORINE FLUORINE				APPLIC	CABLE
0.5 100.0 6.0 0.5 0.7 200.0		CHLORINE FLUORINE				V	
100.0 6.0 0.5 0.7 200.0		CHLORINE FLUORINE					4
6.0 0.5 0.7 200.0		FLUORINE					¦
0.5 0.7 200.0 0.7							¦
0.7 200.0 0.7		1001112				·····	† ·
200.0 0.7		SULFUR				····· 🛱	¦
0.7		POTASSIUM				····· 🕏	i
						····· 🕌	¦
0.5		SODIUM				==	i 
		AMMONIA				· · · · · · ·	 
0.2		CYANIDE AMENABLE				· · · · · · · ·	, 
3		CYANIDE REACTIVE				<u>v</u>	ļ r
200.0		CYANIDE TOTAL				<b>_</b>	ļ 
200.0		SULFIDE REACTIVE				~	<u> </u>
200.0		HOCs		PCBs			_
200.0					_		
7.5							
0.13							
0.13		>= 1000 PPWI					
0.5							
3.0				CFR 761?			
2.0				YE	s 🗸	NO	
100.0				·		_	
<del></del>							
0.008							
	7.5 0.13 0.13 0.13 0.5 3.0 2.0 100.0 5.0 400.0 2.0  6 0.02 0.4 10.0 0.5 10.0 1.0 0.03	7.5 0.13 0.13 0.5 3.0 2.0 100.0 5.0 400.0 2.0  0.4 10.0 0.5 10.0 1.0 0.03	7.5 0.13 0.13 0.5 3.0 2.0 100.0 5.0 400.0 2.0  0.02 0.4 10.0 0.5 10.0 0.5 10.0 0.03	7.5 0.13 0.13 0.5 3.0 2.0 100.0 5.0 400.0 2.0  0.02 0.4 10.0 0.5 10.0 0.5 10.0 0.03	7.5 0.13 0.13 0.5 0.13 0.5 0.00 0.00 0.00 0.00 0.00 0.00 0.00	NONE	7.5

DOES THIS WASTE HAVE ANY UNDISCLOSED HAZARDS OR PRIOR INCIDENTS ASSOCIATED WITH IT, WHICH COULD AFFECT THE WAY IT SHOULD BE HANDLED?

YES NO (If yes, explain)

**CHOOSE ALL THAT APPLY** 

DEA REGULATED SUBSTANCES EXPLOSIVE FUMING OSHA REGULATED CARCINOGENS
POLYMERIZABLE RADIOACTIVE REACTIVE MATERIAL NONE OF THE ABOVE



REGULAT	ORY	STATI	JS					
YES	✓	NO	USEPA HAZARDOUS W	ASTE?				
YES	<b>~</b>	NO	DO ANY STATE WASTE	CODES APPLY?				
			Texas Waste Code					
YES	<b>~</b>	NO		OVINCIAL WASTE CODES A	PPLY?			
YES	~	NO	IS THIS WASTE PROHIE	SITED FROM LAND DISPOSA	AL WITHOUT FURTHER TREAT	TMENT PE	ER 40 CFR PART 268?	
			LDR CATEGORY: VARIANCE INFO:	Not subject to LDR				
YES	•	NO	IS THIS A UNIVERSAL V	l /ASTE?				
YES	<b>~</b>	NO	IS THE GENERATOR OF	THE WASTE CLASSIFIED A	AS VERY SMALL QUANTITY G	ENERATO	R (VSQG) OR A STATE EQUIVALENT	DESIGNATION?
YES		NO	IS THIS MATERIAL GOIN	NG TO BE MANAGED AS A F	RCRA EXEMPT COMMERCIAL	PRODUCT	Γ, WHICH IS FUEL (40 CFR 261.2 (C)(2	2)(II))?
YES	<b>~</b>	NO	DOES TREATMENT OF	THIS WASTE GENERATE A	F006 OR F019 SLUDGE?			
YES		NO	IS THIS WASTE STREAM	M SUBJECT TO THE INORGA	ANIC METAL BEARING WASTE	E PROHIBI	ITION FOUND AT 40 CFR 268.3(C)?	
YES	✓	NO	DOES THIS WASTE CO	NTAIN VOC'S IN CONCENTE	RATIONS >=500 PPM?			
YES		NO	DOES THE WASTE CON	ITAIN GREATER THAN 20%	OF ORGANIC CONSTITUENTS	S WITH A	VAPOR PRESSURE >= .3KPA (.044 PS	SIA)?
YES	~	NO	DOES THIS WASTE COI	NTAIN AN ORGANIC CONST	TITUENT WHICH IN ITS PURE I	FORM HAS	S A VAPOR PRESSURE > 77 KPA (11.	2 PSIA)?
YES	~	NO	IS THIS CERCLA REGUI	ATED (SUPERFUND ) WAS	TE ?			
YES	✓	NO	IS THE WASTE SUBJEC	T TO ONE OF THE FOLLOW	ING NESHAP RULES?			
			Hazardous Organic	NESHAP (HON) rule (subpar	t G) Pharmaceut	ticals produ	uction (subpart GGG)	
YES		NO	IF THIS IS A US EPA HA	ZARDOUS WASTE, DOES T	HIS WASTE STREAM CONTAI	N BENZEN	NE?	
	YES						ene NESHAP or is this waste regulated ng, coke by-product recovery, or petrole	
	YES		NO Is the generating	g source of this waste stream	a facility with Total Annual Benz	zene (TAB)	>10 Mg/year?	
	Wha	t is the	TAB quantity for your faci	lity?	Megagram/year (1 Mg = 2,	,200 lbs)		
	The	basis f	or this determination is: Kr	owledge of the Waste Or Tes	t Data		Knowledge Testing	
			ne knowledge :					
G. DOT/								
			PPING NAME:	-A.C.\				
			EGULATED, (SOIL, PI	·A5)				
			REQUIREMENTS FREQUENCY • ONE	TIME WEEKLY MONTH	ILY QUARTERLY YEARL	Y OTHE	ΕR	
	V	CC	NTAINERIZED		BULK LIQUID		BULK SOLID	
22		_	RS/SHIPMENT	GALLONS/SHIP	MENT: <b>0 Min -0 Max</b>	GAL.	SHIPMENT UOM: TO	ON YARD
TORAGE (					O Milli O Max		TONS/YARDS/SHIPMENT: 0 Min -	- 0 Max
		TOTE TA	NK BOX CARTON CA	SE			<u></u>	
	IC YARE	ВОХ	DRUM					
ОТН	ER:		DRUM SIZE: 55					
I. SPECIAL	REQ	UEST						
COMMEN Profile is wri			ESTS: case analysis.					
SENERATOR	'S CEI	RTIFICA	ATION					
samples subr	nitted a	re repre					documents is correct to the best of my knowlents Clean Harbors the authority to amend the part of the	
_AU⁻	THOR	ZED S	SIGNATURE	NAME (PRINT)		TITLE	DAT	E
0)01	in	Ma	cedo .	John Macedo	Environr	mental N	Manager 7 Sept 2	2018



GAS/AEROSOL

## WASTE MATERIAL PROFILE SHEET

Clean Harbors Profile No. CH1710872 A. GENERAL INFORMATION California Air National Guard GENERATOR NAME: GENERATOR EPA ID #/REGISTRATION # GENERATOR CODE (Assigned by Clean Harbors) STATE/PROVINCE Fresno CA ZIP/POSTAL CODE CA64340 93727 ADDRESS 5323 E McKinlev Avenue (Fresno ANGB) PHONE: (559) 454-5236 CUSTOMER CODE (Assigned by Clean Harbors) AE12881 CUSTOMER NAME: **AECOM** ADDRESS 12420 Milestone Dr Ste 150 CITY Germantown STATE/PROVINCE MD ZIP/POSTAL CODE 20876 **B. WASTE DESCRIPTION** WASTE DESCRIPTION: **IDW Water** PROCESS GENERATING WASTE: Water sampling IS THIS WASTE CONTAINED IN SMALL PACKAGING CONTAINED WITHIN A LARGER SHIPPING CONTAINER? C. PHYSICAL PROPERTIES (at 25C or 77F) NUMBER OF PHASES/LAYERS VISCOSITY (If liquid present) PHYSICAL STATE COLOR SOLID WITHOUT FREE LIQUID 1 - 100 (e.g. Water) 0.00 **POWDER** clear MIDDLE 101 - 500 (e.g. Motor Oil) 0.00 % BY VOLUME (Approx.) MONOLITHIC SOLID LIQUID WITH NO SOLIDS **BOTTOM** 501 - 10,000 (e.g. Molasses) 0.00 LIQUID/SOLID MIXTURE > 10,000 % FREE LIQUID **ODOR** % SETTLED SOLID TOTAL ORGANIC CARBON MELTING POINT °F (°C) BOILING POINT °F (°C) NONE % TOTAL SUSPENDED SOLID <= 95 (<=35) SLUDGE MILD < 140 (<60) <= 1%

140-200 (60-93) 1-9% 101 - 129 (38-54) Describe: > 200 (>93) >= 10% >= 130 (>54) FLASH POINT °F (°C) SPECIFIC GRAVITY ASH BTU/LB (MJ/kg) pН < 0.8 (e.g. Gasoline) < 73 (<23) < 2,000 (<4.6) <= 2 < 0.1 > 20 ~ 0.8-1.0 (e.g. Ethanol) 73 - 100 (23-38) 2.1 - 6.9 2,000-5,000 (4.6-11.6) 0.1 - 1.0 Unknown 1.0 (e.g. Water) 101 -140 (38-60) 5,000-10,000 (11.6-23.2) 7 (Neutral) 1.1 - 5.0141 -200 (60-93) > 10,000 (>23.2) 7.1 - 12.4 1.0-1.2 (e.g. Antifreeze) 5.1 - 20.0 > 200 (>93) >= 12.5 > 1.2 (e.g. Methylene Chloride) Actual:

95 - 100 (35-38)

D. COMPOSITION (List the complete composition of the waste, include any inert components and/or debris. Ranges for individual components are acceptable. If a trade name is used,

CHEMICAL MIN MAX LIOM POLYFLUOROALKYL SUBSTANCES -- 500.0000000 PPM 0.0000000 **WATER** 100.0000000 100.0000000 %

DOES THIS WASTE CONTAIN ANY HEAVY GAUGE METAL DEBRIS OR OTHER LARGE OBJECTS (EX., METAL PLATE OR PIPING >1/4" THICK OR >12" LONG, METAL REINFORCED HOSE >12" LONG, METAL WIRE >12" LONG, METAL VALVES, PIPE FITTINGS, CONCRETE REINFORCING BAR OR

STRONG

YES NO

PIECES OF CONCRETE >3")? If yes, describe, including dimensions:

YES

DOES THIS WASTE CONTAIN OR HAS IT CONTACTED ANY OF THE FOLLOWING; ANIMAL WASTES, HUMAN BLOOD, BLOOD PRODUCTS, BODY FLUIDS, MICROBIOLOGICAL WASTE, PATHOLOGICAL WASTE, HUMAN OR ANIMAL DERIVED SERUMS OR PROTEINS OR ANY OTHER POTENTIALLY INFECTIOUS MATERIAL?

✓ YES NO ~

NO

I acknowledge that this waste material is neither infectious nor does it contain any organism known to be a threat to human health. This certification is based on my knowledge of the material. Select the answer below that applies:

The waste was never exposed to potentially infectious material.

YES NO

Chemical disinfection or some other form of sterilization has been applied to the waste.

DOES THIS WASTE CONTAIN ANY METALS IN POWDERED OR OTHER FINELY DIVIDED FORM?

YES NO

I ACKNOWLEDGE THAT THIS PROFILE MEETS THE CLEAN HARBORS BATTERY PACKAGING REQUIREMENTS.

YES NO YES NO

LACKNOWLEDGE THAT MY FRIABLE ASBESTOS WASTE IS DOUBLE BAGGED AND WETTED

SPECIFY THE SOURCE CODE ASSOCIATED WITH THE WASTE.

G12

SPECIFY THE FORM CODE ASSOCIATED WITH THE WASTE. W101



#### **E. CONSTITUENTS**

Are these values based on testing or knowledge?

Knowledge V Testing

If constituent concentrations are based on analytical testing, analysis must be provided. Please attach document(s) using the link on the Submit tab.

Please indicate which constituents below apply. Concentrations must be entered when applicable to assist in accurate review and expedited approval of your waste profile. Please note that the total regulated metals and other constituents sections require answers.

RCRA	REGULATED METALS	REGULATORY LEVEL (mg/l)	TCLP mg/l	TOTAL	UOM	NOT APPLI	CABLE	
D004	ARSENIC	5.0				✓		
D005	BARIUM	100.0				<b>~</b>		
D006	CADMIUM	1.0				~		
D007	CHROMIUM	5.0				<b>▽</b>		
D008	LEAD	5.0				~		
D009	MERCURY	0.2				<u>~</u>		
D010	SELENIUM	1.0				······		
D011	SILVER	5.0				·····		
	VOLATILE COMPOUNDS			OTHER CONSTITUENTS		MAY	LIOM	NOT
D018	BENZENE	0.5		OTHER CONSTITUENTS	•	MAX	UOM	NOT APPLICABLE
D019	CARBON TETRACHLORIDE	0.5		BROMINE				~
D021	CHLOROBENZENE	100.0		CHLORINE				<u></u>
D022	CHLOROFORM	6.0		FLUORINE				·····
D028	1,2-DICHLOROETHANE	0.5		IODINE				····· 🛱 ·····
D028	1,1-DICHLOROETHYLENE	0.5		SULFUR				····· 🛱 ·····
D025	METHYL ETHYL KETONE			POTASSIUM				····· 🛱 ·····
		200.0		SODIUM				· <del>-</del>
D039	TETRACHLOROETHYLENE	0.7		AMMONIA				· 🛱 ·
D040	TRICHLOROETHYLENE	0.5						····- <del> </del>
D043	VINYL CHLORIDE	0.2		CYANIDE AMENABLE				· <del> </del>
	SEMI-VOLATILE COMPOUNDS	S		CYANIDE REACTIVE				🚐
D023	o-CRESOL	200.0		CYANIDE TOTAL				<u>V</u>
D024	m-CRESOL	200.0		SULFIDE REACTIVE				<u> </u>
D025	p-CRESOL	200.0		HOCs		PCBs		
D026	CRESOL (TOTAL)	200.0		- NONE		✓ NON	=	
D027	1,4-DICHLOROBENZENE	7.5		< 1000 PPM		< 50		
D030	2,4-DINITROTOLUENE	0.13		>= 1000 PPM		>=50		
D032	HEXACHLOROBENZENE	0.13						T 10 THE
D033	HEXACHLOROBUTADIENE	0.5					RE PRESEN GULATED I	BY TSCA 40
D034	HEXACHLOROETHANE	3.0				CFR 761?		
D036	NITROBENZENE	2.0		•		YE	s 🗸	NO
D037	PENTACHLOROPHENOL	100.0		-				1
D038	PYRIDINE	5.0		<u>-</u>				
D041	2,4,5-TRICHLOROPHENOL	400.0		•				
D042	2,4,6-TRICHLOROPHENOL	2.0		•				
	PESTICIDES AND HERBICIDE			-				
D012	ENDRIN	0.02						
D013	LINDANE	0.4		-				
D014	METHOXYCHLOR	10.0		-				
D014		0.5		-				
D016	2,4-D	10.0		-				
D010		1.0		-				
	2,4,5-TP (SILVEX)							
D020	CHLORDANE	0.03		-				
D031	HEPTACHLOR (AND ITS EPOXIDE	) 0.008						

DOES THIS WASTE HAVE ANY UNDISCLOSED HAZARDS OR PRIOR INCIDENTS ASSOCIATED WITH IT, WHICH COULD AFFECT THE WAY IT SHOULD BE HANDLED?

YES NO (If yes, explain)

**CHOOSE ALL THAT APPLY** 

DEA REGULATED SUBSTANCES EXPLOSIVE FUMING OSHA REGULATED CARCINOGENS
POLYMERIZABLE RADIOACTIVE REACTIVE MATERIAL NONE OF THE ABOVE



REGULA	TORY	STAT	JS					
YES	~	NO	USEPA HAZARDOUS WASTE?					
YES	~	NO	DO ANY STATE WASTE CODE	S APPLY?				
			Texas Waste Code					$\dashv$
YES	~	NO	DO ANY CANADIAN PROVINCI	AL WASTE CODES APPLY	>			
YES	~	NO	IS THIS WASTE PROHIBITED F	ROM LAND DISPOSAL WIT	THOUT FURTHER TRE	EATMENT PE	R 40 CFR PART 268?	
			LDR CATEGORY: Not s	ubject to LDR				
YES	V	NO	IS THIS A UNIVERSAL WASTE	)				
YES	~	NO			RY SMALL OLIANTITY	GENERATO	PR (VSQG) OR A STATE EQUIVALENT DESIGNATION	N2
YES		NO					Γ, WHICH IS FUEL (40 CFR 261.2 (C)(2)(II))?	
YES	~	NO	DOES TREATMENT OF THIS W			LI NODOO!	,, WHIGH 10 1 022 (10 01 11 201.2 (0)(2)(II)).	
YES	•	NO				STE DROHIRI	ITION FOUND AT 40 CFR 268.3(C)?	
YES	V	NO	DOES THIS WASTE CONTAIN			JIL I KOI IIDI	1110N 1 00ND AT 40 CTN 200.5(0):	
YES		NO				NTS WITH A V	VAPOR PRESSURE >= .3KPA (.044 PSIA)?	
YES	V	NO					S A VAPOR PRESSURE > 77 KPA (11.2 PSIA)?	
YES	~	NO	IS THIS CERCLA REGULATED				57	
YES	~	NO	IS THE WASTE SUBJECT TO C	,	IESHAP RULES?			
			Hazardous Organic NESH/			euticals produ	uction (subpart GGG)	
YES		NO	IF THIS IS A US EPA HAZARDO			•	, ,	
	YES			•			ene NESHAP or is this waste regulated under the benz	zene
							ng, coke by-product recovery, or petroleum refinery pro	
	YES		9	e of this waste stream a facil	•	, ,	>10 Mg/year?	
			e TAB quantity for your facility?		/legagram/year (1 Mg =	: 2,200 lbs)		
			for this determination is: Knowledg	e of the waste of Test Data			Knowledge Testing	
0.007/			ne knowledge :					
G. DOT/								
		_	IPPING NAME: EGULATED, (WATER, PFAS	3				
			REQUIREMENTS	, 				
			FREQUENCY ONE TIME	WEEKLY MONTHLY	QUARTERLY YEA	RLY OTHE	≣R	
	V	C	ONTAINERIZED	1	BULK LIQUID		BULK SOLID	
<u>20</u>	CONT	AINE	RS/SHIPMENT	GALLONS/SHIPMENT	· O Min -O May	GAL.	SHIPMENT UOM: TON Y.	ARD
TORAGE				971220710707 III III 2111	· O MIIII -O MIGA	0/ 1.2.	TONS/YARDS/SHIPMENT: 0 Min - 0 Max	
ONTAINE! POF	TABLE		NK BOX CARTON CASE				TONO, TARDO, OTHERIT. O MINT - O MAX	
CUE	SIC YARE	вох	DRUM					
OTH	IER:		DRUM SIZE: 55					
I. SPECIAI	PEO	HEST						
COMME			ESTS:					
GENERATO	r'S CEI	TIFIC	ATION					
				red agent. I hereby certify that all	information submitted in th	is and attached	documents is correct to the best of my knowledge.I also certify	that any
samples subi	nitted a	re repre					nts Clean Harbors the authority to amend the profile, as Clean F	
	,,		• •					
$\sim$				NAME (PRINT)		TITLE	DATE	
	hn	Mi	acedo John	Macedo	Environ	mental Ma	anager 7 Sept 2018	

