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January 31, 2019

Mr. Javenal Q. Salomon Remedial Project Manager 428 Chapin Street Shaw AFB SC 29152-5123

Mr. Michael W. Danielsen RCRA Federal Facilities Section Division of Waste Management SCDHEC - Bureau of Land and Waste Management 2600 Bull Street Columbia SC 29201-1708

SUBJECT: Submittal of the Final Site Inspections Report of Fire Fighting Foam Usage at Shaw Air Force Base Sumter County, South Carolina, dated January 2019

Dear Mr. Danielson

Shaw AFB respectfully submits the Final Site Inspections Report of Fire Fighting Foam Usage at Shaw Air Force Base Sumter County, South Carolina, dated January 2019 for your records.

If you have any questions, please contact me at (803) 895-9991.

Sincerely

NON: OS-12, DAF

Attachmont: Two hard copies and two compact discs of the subject document.

ee: AFCEC/CZOE (Juvenal Q. Salomon)



# RECEIVED

FEB 07 2019

SC DHEC - Bureau of Land & Waste Menagement

MEMORANDUM FOR RECORD

SUBJECT: Submittel of the Draft Final Site Inspections Report of Fire Fighting Foam Usage at Shaw Air Force Base Sumter County, South Carolina, dated January 2019

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

IÉNAL O. SAUG **Reflectial Project Manager** 

	Comment and Response Worksheet (Version 3)								
Date 12/03/18		Surveillance Activity Number					Draft Final SI Report, Shaw AFB	Contract/TO Number	
Item		Section	Page	Para	Line	Class		Response	
			-				outh Caroline Department of Health and Environmental Control (SCDHEC)	Response	
1	SCDHEC		7				The text states that the 16 temporary wells were removed, and all borings were back filled with bentonite. The DHEC approval for the temporary monitoring wells and borings greater than five feet below ground surface were to have been abandoned with bentonite-cement mixture. Also, DHEC stated in the approval that a SC certified well driller be used to complete the temporary monitoring wells and the environmental soil borings. There was no record of the driller listed in being certified in South Carolina. Please explain why the DHEC approval was not followed.	All of the borings and temporary wells installed during the SI were abandoned by pressure grouting with a cement/bentonite slurry from total depth to surface in accordance with the SCDHEC well approval. The text has been revised to reflect this. A SC certified driller, Christopher Matthew Lacko (License Number: 1982) of Cascade Drilling, oversaw all drilling operations. This information has been added to the text.	
2	SCDHEC		7				For future investigations SC certified drillers and surveyors must be used for conducting field work.	A SC certified driller and a surveyor were used during all drilling and surveying operations and will be used during any future work.	
3	SCDHEC	Sect 3.9	35				This section states that revised USAF guidance was provided for handling IDW disposal to minimize waste generation. DHEC was not aware of the revised guidance since it was developed after approval of the UFP QAPP. For informational purposes, please submit a copy of the revised USAF guidance for IDW handling.	The USAF IDW Guidance for AFFF waste streams is currently in draft form only and will be provided when it is finalized.	
4	SCDHEC	Sect 4.0					This section discusses the groundwater detections for each area and identifies the nearest down gradient drinking water wells. For the drinking water wells screened in the surficial aquifer the pathway is complete and there is a potential for impact. For the deeper wells impact is not known as there were no samples collected from the deeper aquifers. Due to the stratigraphy at Site 1 (SWMU 59) as shown in the Draft 2018 CMIPR for SWMU 59, where the Upper Black Creek formation does not exist and possibly a non-continuous confining unit, there is the possibility for communication between the surficial aquifer and the deeper aquifers at Site 1. DHEC recommends the deeper wells at Site 1 be sampled during the next sampling event. In addition, since the surficial aquifer does discharge to Long Branch Creek as stated in Figure 4-2 in the Draft 2018 CMIPR for SWMU 59, the continued annual monitoring of Long Brach Creek as part of the CMIPR, and the positive detections of PFC compounds in the groundwater at Site 1, DHEC recommends sampling Long Branch Creek during the next sampling event.	The recommendation for sampling wells screened in the deeper aquifer at AFFF Area 1 have been added to Section 8.1 and will be included in the QAPP for the ESI. The recommendation for collecting surface water/sediment samples from Long Branch Creek has been added to Section 8.1 and will be included in the QAPP for the ESI.	
5	SCDHEC	Sects 8.1 through 8.6					This section discusses each site and recommends an expanded site investigation (SI) to be followed by a remedial investigation (RI). DHEC agrees with this recommendation for each site. The January 10, 2017 DHEC comments for the review of the November 2016 and January 2016 work plans outlining the field work to conduct the PFC investigation (which this current report documents) DHEC suggested that the land application of sludge area (east of Site 4 and listed in the SAFB Hazardous Waste Permit as SWMU 56) be investigated for PFC compounds. Since there were detections of PFC compounds in the drying beds at Site 6, DHEC highly suggests that the land application areas of sludge from the WWTP (Site 6) be included in the expanded SI the Air Force has recommended.	Concurrence noted regarding the recommendations for each site. The Air Force will consider conducting additional investigation of the land application areas for PFAS compounds in accordance with the SCDHEC recommendations. No change to the document.	



# Final Site Inspections Report of Fire Fighting Foam Usage at Shaw Air Force Base Sumter County, South Carolina

January 2019

Submitted to: Air Force Civil Engineer Center 3515 General McMullen Suite 155 San Antonio, Texas 78226-2018

Submitted by: U.S. Army Corps of Engineers Savannah District 100 W. Oglethorpe Avenue Savannah, Georgia 31401-3640

**Prepared by:** 

Aerostar SES LLC 1006 Floyd Culler Court Oak Ridge, Tennessee 37830-8022 under Contract No. W912HN-15-C-0022



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# Acronyms and Abbreviations

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	aqueous film forming foam
amsl	above mean sea level
ASL	Aerostar SES LLC
bgs	below ground surface
BRAC	Base Closure and Realignment
btoc	below top of casing
CAS	Chemical Abstracts Service
CSM	conceptual site model
DPT	direct push technology
dup	duplicate sample
DŴ	drinking water
EOD	explosive ordnance disposal
EPA	Environmental Protection Agency
ERP	Environmental Restoration Program
EZ	exclusion zone
ft	foot or feet
FTA	fire training area
GW	groundwater
HA	health advisory
HDPE	high-density polyethylene
Hi-Ex	high-expansion
HQ	hazard quotient
ID	identification
IDW	investigation-derived waste
J	estimated value
0	milligrams per kilogram
mg/kg NAD83	North American Datum 1983
NAVD88	North American Vertical Datum 1985
ND	not detected at the method detection limit
NL	not listed
No.	number
PA	preliminary assessment
PFAS	per- and polyfluorinated alkyl substances
PFBS	perfluorobutane sulfonate
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
pН	potential of hydrogen
PID	photoionization detector
PPE	personal protective equipment
PPM	parts per million
QAPP	quality assurance project plan
QC	quality control
RI	remedial investigation
RSL	Regional Screening Level

Rust SCDHEC	Rust Environmental & Infrastructure South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SD	sediment
SHAW	ERPIMS code for Shaw Air Force Base
SI	site inspection
SO	subsurface soil
SS	surface soil
SW	surface water
TOC	total organic carbon
U	parameter not detected at the method detection limit
USCS	Unified Soil Classification System
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
WWTP	wastewater treatment plant

# **1.0 INTRODUCTION**

Aerostar SES LLC (ASL) under contract to the United States Army Corps of Engineers Savannah District (Contract No. W912HN-15-C-0022) conducted screening-level site inspections (SIs) for six areas at Shaw Air Force Base (AFB) in Sumter County, South Carolina (Figure 1, Appendix A). The purpose of the SI is to determine the presence or absence of perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and perfluorobutane sulfonate (PFBS) in the environment at these areas. These compounds are a class of synthetic fluorinated chemicals used in industrial and consumer products, including defense-related applications. This class of compounds is also referred to as per- and polyfluorinated alkyl substances (PFAS).

In 1970, the United States Air Force (USAF) began using aqueous film forming foam (AFFF), firefighting agents containing PFOS and PFOA, to extinguish petroleum fires. Releases of AFFF to the environment routinely occurred during fire training and equipment maintenance, storage, and use. Although manufacturers have reformulated AFFF to eliminate PFOS, the USAF maintains a significant inventory of PFOS-based AFFF. As of this report, the USAF is actively removing PFOS-based AFFF from its inventory and replacing it with formulations based on shorter carbon chains, which may be less persistent and bioaccumulative in the environment.

The objectives of this study are to

- determine if a confirmed release of PFOS, PFOA, or PFBS has occurred at AFFF areas selected for inspection;
- determine if PFOS or PFOA is present in groundwater or surface water in the areas at concentrations exceeding the Environmental Protection Agency (EPA) lifetime health advisory (HA);
- determine if PFBS is present in groundwater or surface water in the areas at concentrations exceeding the EPA Regional Screening Levels (RSLs);
- determine if PFOA or PFOS is present in soil or sediment in the areas at concentrations exceeding the calculated RSLs;
- determine if PFBS is present in soil or sediment in the areas at concentrations exceeding the EPA RSLs; and
- identify potential receptor pathways with immediate impacts to human health (immediate impact to human health is considered consumption of drinking water with PFOS or PFOA above the HA or PFBS above the RSL).

This report does not include assessment of ecological exposure pathways, receptors, or risk from PFAS impacts to the environment. Confirmed releases may require further investigation to fully delineate the extent of contamination and perform a complete risk assessment that includes ecological receptors.

In the quality assurance project plan (QAPP) (ASL, January 2016), screening levels for soil and sediment were established in accordance with *Interim AF Guidance on Sampling and Response Actions for Perfluorinated Compounds at Active and Base Closure and Realignment (BRAC) Installations* (USAF, August 2012). However, after publication of the QAPP, the USAF determined that more conservative screening levels were appropriate. Therefore, screening levels for PFOS and PFOA in soil and sediment were calculated using EPA's RSL calculator (https://epaprgs.ornl.gov/cgi-bin/ chemicals/csl\_search). The calculations published in the final site-specific QAPP addendum (ASL, February 2017) were conducted using the residential scenario with a hazard quotient (HQ) of 1.0. The HQ was revised after publication of the QAPP addendum, and the calculator is the Tier 3 value reference dose of 0.02 micrograms per kilogram (µg/kg) per day derived by EPA in its drinking water HAs for both PFOS (EPA, May 2016a) and PFOA

(EPA, May 2016b). The calculations are available in Appendix B. A release is considered confirmed when the following concentrations are exceeded:

## **PFOS:**

- 0.07 micrograms per liter ( $\mu$ g/L) in groundwater or surface water (independently or combined with PFOA value).
- 126 µg/kg in soil (calculated, in the absence of EPA RSL values).
- $126 \mu g/kg$  in sediment (calculated, in the absence of RSL values).

# **PFOA:**

- 0.07 µg/L in groundwater or surface water (independently or combined with PFOS value).
- $126 \mu g/kg$  in soil (calculated, in the absence of RSL values).
- $126 \mu g/kg$  in sediment (calculated, in the absence of RSL values).

EPA has derived RSL values for PFBS, for which there is a Tier 2 toxicity value (Provisional Peer Reviewed Toxicity Value) (EPA, June 2014). The requirement to screen for PFBS, which is regulated by EPA, was not recognized before the QAPP (ASL, January 2016) was finalized and was added by the Air Force Civil Engineer Center (AFCEC) before the development of the QAPP addendum. The USAF will also consider a release to be confirmed if the following concentrations are exceeded: **PFBS:** 

- $40 \,\mu\text{g/L}$  in groundwater or surface water.
- 130,000 µg/kg in soil or sediment.

To streamline reporting and discussion of PFOS, PFOA, and PFBS sampling and analysis, these compounds will hereafter be referred to, collectively, as "PFAS." Table 1 presents the screening values for comparing the analytical results for these three PFAS compounds.

Domoniston	Chemical	EPA Regional S (May 2	0	Calculated RSL for Soil and	Health Advisory for Drinking Water (Surface Water or Groundwater) (µg/L) <sup>c</sup>	
Parameter	Abstracts Number	Residential Soil (µg/kg)	Drinking Water (µg/L)	Sediment <sup>b</sup> (µg/kg)		
Perfluorobutane sulfonate (PFBS)	29420-43-3	130,000	40	NL	NL	
Perfluorooctanoic acid (PFOA)	335-67-1	NL	NL	126	0.07*	
Perfluorooctane sulfonate (PFOS)	1763-23-1	NL	NL	126	0.07**	

#### **Table 1 Screening Values**

<sup>a</sup> EPA Regional Screening Levels (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup> Screening levels calculated using the EPA Regional Screening Level calculator for residential soil (https://epa-prgs.ornl.gov/cgibin/ chemicals/ csl\_search). The toxicity value input for the calculator is the Tier 3 value reference dose of 0.02 µg/kg per day derived by EPA in its drinking water HAs for both PFOS (May 2016a) and PFOA (May 2016b).

<sup>c</sup> EPA, May 2016a. Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS) and EPA, May 2016b. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA).

\*Note: When PFOA and PFOS are both detected, the combined concentrations of the compounds should be compared with the  $0.07 \mu g/L$  HA value. Only groundwater and surface water were sampled during the SI, but analytical results have been compared to the drinking water screening levels.

 $\mu g/kg = micrograms per kilogram$ 

EPA = Environmental Protection Agency

 $\mu g/L = micrograms \text{ per liter}$ NL = not listed

AFFF areas were selected for further inspection through the SI process at Shaw AFB during the preliminary assessment (PA) phase and documented in a PA report (CH2M Hill, October 2015). Eleven sites were evaluated during the PA, and four (former Fire Training Area [FTA] 1, former FTA 2, former FTA 3/Current Explosive Ordnance Disposal [EOD] Area, and the current FTA) were identified as

requiring initiation of an SI. Two additional areas (Building 1511 and the Wastewater Treatment Plant [WWTP]) were added after the SI scoping visit. The areas were selected based on the reported or suspected release of AFFF. The six AFFF areas selected for SI and the rationale for inclusion are listed in Table 2. Media evaluated during the SI included surface soil (0 to 6 inches deep); subsurface soil (in the vadose zone collected immediately above the water saturated/unsaturated soil interface); groundwater (including samples from existing monitoring wells, temporary wells, and/or direct push sampling); surface water; and sediment.

AFFF Area	AFFF Inspection Area	Associated Existing ERP Site	Area Selection Rationale		
1	Former FTA 1	FT-01	According to some records, the FTA was closed prior to 1970. However, discrepancies exist in the documentation on the years of operation and whether AFFF was used at the area. Quantities of AFFF potentially discharged in the area are unknown.		
2	Former FTA 2	FT-07	The FTA was operational from 1970 to 1991. AFFF was reportedly used during training exercises, but quantities discharged are unknown.		
3	Former FTA 3/ Current EOD Area	FT-06	The FTA was operational from 1981 to 1989. AFFF was reportedly used during training exercises, but quantities discharged are unknown.		
4	Current FTA	New site	The FTA has been in operation since 1992. AFFF is not used during regular training exercises at this propane-fueled FTA. Annual AFFF system spray testing for the fire department vehicles is performed in the area, but the quantities released are unknown. The lined FTA channels water to the adjacent foam collection pond, which has an outfall to the adjacent low-lying area.		
5	Building 1511	New site	Bays 1 and 2 have an AFFF fire suppression system. The building was evaluated during the PA, but there have been no known AFFF discharges, and it was suggested for close out with no additional investigation. Although there have been no known discharges of AFFF, SCDHEC requested that the area be added to the SI.		
6	Wastewater Treatment Plant	New site	The WWTP was not evaluated during the PA. The USAF added the WWTP to the SI because it serves as the collection point for AFFF releases entering the sanitary sewer system at the base.		
	AFFF = aqueous film forming foamERP = Environmental Restoration ProgramEOD = explosive ordnance disposalFTA = fire training areaBoth = Construction ProgramFTA = fire training area				

Table 2	Areas for	Site Ins	pections at	Shaw A	Air Force	Base
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PA = preliminary assessment SI = site inspection

SCDHEC = South Carolina Department of Health and Environmental Control USAF = United States Air Force

WWTP = wastewater treatment plant

Shaw AFB is approximately 37 miles east of Columbia and 7 miles northwest of Sumter near the center of Sumter County in central South Carolina. The base was constructed in 1941 to provide flight training to air cadets and was named in honor of Lieutenant Ervin David Shaw, one of the first Americans to fly combat missions in World War I. During World War II, thousands of pilots learned basic and advanced flying techniques at Shaw AFB in single and multi-engine aircraft. The base also served as a camp for German prisoners of war in 1945. Through the years, Shaw AFB has been home to numerous divisions of the military and currently serves as headquarters for the Ninth Air Force and as host wing for the 20th Fighter Wing. The base encompasses approximately 3,326 acres in a mostly rural and agricultural area,

but there are residential and commercial developments on the western and southeastern sides of the facility (Rust Environmental & Infrastructure [Rust], February 1995).

Shaw AFB has a humid, subtropical climate with an annual average temperature of 62.15 degrees Fahrenheit. Temperatures range from an average low of 50.5 degrees Fahrenheit in winter to 73.8 degrees Fahrenheit in summer. The average annual precipitation is 46.93 inches and is generally distributed evenly throughout the year. Prevailing winds in the area are predominantly from the south-southwest and average 9 miles per hour (U.S. Climate Data, August 2016).

# 2.0 AFFF AREA DESCRIPTIONS

The following sections describe the AFFF areas inspected during the SI. Figure 2 (Appendix A) shows the relative position of the AFFF areas on Shaw AFB.

## 2.1 FORMER FIRE TRAINING AREA 1 (AFFF AREA 1)

Former FTA 1 (also known as Environmental Restoration Program [ERP] Site FT-01) is roughly 3.5 acres and approximately 0.5 mile northeast of the northeast end of Runway 4R/22L, near the northeast perimeter of Shaw AFB (Figure 3, Appendix A). Firefighting training was conducted at FTA 1 from 1941 to approximately 1969. The FTA consisted of an unlined 100-foot-diameter burn circle surrounded by a low earthen berm. The fire training exercises consisted of igniting aviation gasoline, jet fuel, and waste oil in the burn pit and then extinguishing the fire with high-pressure water (sprayed from a fire hose). No records are available regarding the quantities of AFFF discharged at FTA 1, and there is some uncertainty as to whether AFFF was actually used at the area. AFFF was not introduced into USAF inventory prior to 1970; therefore, operations should have ceased at FTA 1 prior to the introduction of AFFF. However, previous reports have indicated that at least some quantities of AFFF were used as an extinguishing agent during the later operating periods of the area. Therefore, it is possible that the period of operation for the area may not have been accurately reported or that Shaw AFB fire crews were early adopters of AFFF (CH2M Hill, October 2015).

## 2.2 FORMER FIRE TRAINING AREA 2 (AFFF AREA 2)

Former FTA 2 (also known as ERP Site FT-07) is in a clearing within a wooded area approximately 1,800 feet east of Runway 4R/22L and near the southeast corner of the munitions unloading pad (Figure 4, Appendix A). Firefighting training activities were conducted at FTA 2 from 1970 to 1981. Training exercises consisted of spraying the unlined earthen burn pit with water and applying approximately 300 to 1,000 gallons of flammable material (reportedly only JP-4), igniting the fuel, and extinguishing the resulting fire using water and AFFF. There were documented releases of AFFF at FTA 2, but the quantities released were not recorded (CH2M Hill, October 2015).

# 2.3 FORMER FIRE TRAINING AREA 3/ CURRENT EXPLOSIVE ORDNANCE DISPOSAL AREA (AFFF AREA 3)

Former FTA 3 (also known as ERP Site FT-06) is in a clearing in a wooded area approximately 2,500 feet southeast of Runway 4R/22L (Figure 5, Appendix A). The area is used for explosive ordnance disposal. The EOD burn pit consists of concrete walls in an "L" shape approximately 5 feet high and arranged in a rectangular pattern. The concrete structure is approximately 60 feet south and west of the former burn pit area and is used to contain detonations. Firefighting training activities were conducted at FTA 3 from 1981 to 1989. The former FTA consisted of a flat, 75-foot, circular burn pit area with a runoff collection

sump and a tile drain field. The burn pit was lined with compacted clay soil and surrounded by a 2-foothigh earthen berm. Training exercises consisted of spraying the burn pit area with water, applying approximately 300 to 1,000 gallons of flammable material (reportedly only JP-4), igniting the fuel, and extinguishing the resulting fire with water. AFFF was also reportedly used during fire training exercises; however, the quantities of AFFF discharged at FTA 3 are unknown (CH2M Hill, October 2015).

## 2.4 CURRENT FIRE TRAINING AREA (AFFF AREA 4)

The current FTA is approximately 2,200 feet southeast of Runway 4R/22L and south of former FTA 2 (Figure 6, Appendix A). Firefighting training activities have been conducted at the current FTA since 1989. The FTA burn pit consists of gravel covering an impermeable liner with a mock aircraft in the center. The fuel source for the training fires is propane. Water used in the fire training exercises collects in the burn pit and flows to a lined holding pond on the southeast side of the burn pit for reuse. Reportedly, AFFF is not used during the training exercises and only high-pressure water (sprayed from a fire hose) is used to extinguish the fires. However, annual certification testing of the AFFF systems on the Shaw AFB fire trucks is conducted in the area. During the certification testing, AFFF is pumped through the truck systems into the holding pond. The quantity of AFFF discharged during the annual foam system testing has not been recorded. Although the foam is discharged into the lined holding pond, it is possible water containing elevated concentrations of PFASs may have been released through the outfall piping from the pond to a low-lying area adjacent to the south side of the area.

## 2.5 BUILDING 1511 (AFFF AREA 5)

Building 1511 is a five-bay hangar at the north end of the hangar area on the west side of the Shaw AFB airfield (Figure 7, Appendix A). An AFFF fire suppression system serves Bays 1 and 2 (fuel repair bays) with two under-wing turrets. A high-expansion (Hi-Ex) foam system serves Bay 4 (paint spray booth) with overhead sprinklers. Floor drains in the hangar lead to a holding tank at the north end of the building that discharges to the Shaw AFB sanitary sewer system. Although no discharges from the AFFF system were reported in the PA, interviews with base personnel indicate there may have been multiple small releases from the AFFF tank system and from overflow at the holding tank. The South Carolina Department of Health and Environmental Control (SCDHEC) requested that the building be added to the SI process because of the results of interviews with base personnel. During the ASL site scoping visit, facility personnel indicated there had been a one-time accidental release of the foam system in the hangar, but it was not clear whether this was Hi-Ex foam or AFFF. The majority of the foam released during the system dump was reportedly captured in the floor drains of the hangar and carried to the holding tank, but some of the foam reportedly exited through the main hangar doors and was allowed to dissipate on the tarmac. Surface water drainage from the hangar is east toward the grass infield of the taxiway.

## 2.6 WASTEWATER TREATMENT PLANT (AFFF AREA 6)

The Shaw AFB WWTP is at the corner of Aiken Street and Chapin Street in the southwest portion of Shaw AFB (Figure 8, Appendix A). The WWTP was not evaluated during the PA, but AFCEC added it to the SI because releases of AFFF in the hangar area of the base would be carried through the sanitary sewer system to the WWTP. The focus of investigation at the WWTP was the sludge drying beds where concentration of PFAS compounds is most likely to occur. Seven sludge drying beds are at the WWTP (four large and three small beds). The large drying beds are 65 feet long and 20 feet wide. The smaller beds are each 50 feet long and 20 feet wide. Up to 12 inches of sludge can be pumped onto each bed. Digested sludge can be drawn to the drying beds from the digesters by gravity flow depending on the level of sludge in the digester. Alternatively, sludge can be pumped into the drying beds from the

digesters by the new digested sludge pump station. Water from these drying beds flows through underdrains to the wastewater holding tanks and is then pumped to the equalization basin for treatment (Parsons Engineering Science, Inc., September 1995).

# 3.0 FIELD ACTIVITIES

ASL personnel mobilized to Shaw AFB on Tuesday, January 23, 2018, to perform SI sampling activities for all six AFFF areas, and all field activities were completed by Wednesday, January 31, 2018. A readiness review was conducted with all ASL field personnel prior to mobilizing to Shaw AFB. Readiness review forms are presented in Appendix C. The readiness review covered anticipated hazards, types and proper use of equipment needed for field activities, sampling procedures, and procedures to prevent cross-contamination of samples with PFAS-containing compounds.

## 3.1 FIELD ACTIVITIES AND SAMPLING PROCEDURES

Field activities for the SI included collecting groundwater samples from existing groundwater monitoring wells and temporary direct push technology (DPT) wells, collecting surface and subsurface soil samples from DPT soil borings, and collecting surface water and sediment samples. In accordance with the QAPP (ASL, January 2016) and the site-specific field sampling plan QAPP addendum (ASL, February 2017), ASL used a targeted sampling design to collect samples in locations most likely to have detectable concentrations of PFBS, PFOA, and PFOS as a result of an AFFF release. Field forms generated during the sampling activities are in Appendix C. Field forms include readiness review forms, boring logs, well development forms, groundwater sampling logs, soil sampling logs, and surface water and sediment sampling logs. Samples were submitted via overnight courier to Maxxam Analytics International Corporation of Mississauga, Ontario, Canada, under chain of custody procedures. The samples were analyzed by modified EPA Method 537 for 18 PFAS compounds, including the following three PFAS compounds, which are the only ones to have associated health-based screening levels.

Analyte	*CAS Number
• Perfluorooctane sulfonate (PFOS)	1763-23-1
• Perfluorooctanoic acid (PFOA)	335-67-1
• Perfluorobutane sulfonate (PFBS)	29420-43-3
*CAS = Chemical Abstracts Service	

Field duplicate samples were collected at a frequency of one for every 10 samples for each sample media. Matrix spike samples and matrix spike duplicate samples were collected at a frequency of one per every 20 samples for each media. Third-party data validation was conducted on 100% of the analytical data for the PFAS compounds. Stage 2B validation was completed on 90% of the analytical data, and Stage 4 validation was completed on the remaining 10% of the results. Data validation qualifiers were applied as needed. All the results were evaluated as usable for the decisions being made. No determinations of an AFFF release are based upon quality control (QC)-qualified data. The data validation report, laboratory data sheets, and chain of custody forms are in Appendix D.

Field activities were conducted in accordance with the QAPP (ASL, January 2016) and the Shaw AFB site-specific addendum to the QAPP (ASL, February 2017). Soil borings in the areas were advanced with a track-mounted DPT system. Surface soil samples were collected to 6 inches below ground surface (bgs) using stainless steel hand augers and stainless steel spoons. Subsurface soil samples were collected immediately above the water saturated/unsaturated soil interface using a DPT macro-core sampler with acetate liners. For each soil boring, a representative composite soil sample was collected for each depth where samples were collected for PFAS analysis. The composite soil samples were submitted to the

project laboratory for analyses of soil physiochemical properties, including soil potential of hydrogen (pH), grain size, total organic carbon (TOC), and percent solids. The physiochemical analytical results and a summary table (Table E-1) are presented in Appendix E. Groundwater samples were collected with peristaltic pumps through disposable polyvinyl tubing. The groundwater sample from one well in AFFF Area 5 (SHAW05-MW002) was collected as a grab sample using polyvinyl tubing with a check valve on the end because the well did not produce sufficient water to pump. The groundwater samples were collected from temporary wells constructed of 3/4-inch diameter polyvinyl chloride prepacked screens in the DPT borings. Sixteen temporary wells were installed during the SI, and 14 of the wells were installed with 10 feet of prepacked screens. Two wells in AFFF Area 5 (SHAW05-MW001 and SHAW05-MW002) were installed with 15 feet of prepacked screens in an attempt to find groundwater because the borings were dry during drilling. The 16 temporary wells were removed at the end of the sampling event, and all borings were backfilled pressure grouted from total depth to surface with a cement/bentonite slurry. Sediment samples were collected using stainless steel spoons. Surface water samples were collected directly from surface water bodies into the sample containers. All drilling operations were overseen by a South Carolina certified well driller, Christopher Matthew Lacko (License Number: 1982) of Cascade Drilling.

Wellston Associates Land Surveyors of Warner Robins, Georgia, conducted the land survey on January 29, 2018, to establish the coordinates, surface elevations of the soil borings, and top of casing elevations for the temporary wells. ASL personnel recorded surface water and sediment sample locations using a Trimble Geo7X handheld global positioning system (GPS) unit. Northing and easting coordinates were recorded in South Carolina State Plane Coordinates based on the North American Datum 1983 (NAD83) (using the International Foot standard in South Carolina). Elevations were recorded referenced to the North American Vertical Datum 1988 (NAVD88).

Sample locations, site-specific lithology, groundwater flow direction, analytical results, and conclusions for each AFFF area are presented in Sections 3.3 through 3.8.

## 3.2 PFAS CROSS-CONTAMINATION AVOIDANCE PROCEDURES

Field personnel complied with PFAS cross-contamination avoidance procedures and considerations, which are included in ASL Standard Operating Procedure 028 "Field Sampling Protocols to Avoid Cross-Contamination at Perfluorinated Compounds (PFCs) Sites:"

## 3.2.1 Field Equipment

- Teflon<sup>®</sup>-containing materials (Teflon<sup>®</sup> tubing, bailers, tape, plumbing paste, or other Teflon<sup>®</sup> materials) were not used because Teflon<sup>®</sup> contains fluorinated compounds.
- High-density polyethylene (HDPE) and silicon materials are acceptable.
- Peristaltic pumps were used to collect groundwater samples from 19 of the 20 wells through disposable polyethylene tubing. The groundwater sample from monitoring well SHAW05-MW002 was collected as a grab sample using polyethylene tubing with a check valve because the well did not produce sufficient water to use the peristaltic pump. Field notes were recorded in a bound logbook that did not have waterproof paper. All personnel changed gloves between recording and sampling activities to prevent cross-contamination.
- Post-It Notes<sup>®</sup> were not allowed on site.
- Only Sharpie<sup>®</sup> brand markers were used. Pens were used to document field activities in the logbooks and on field forms, to label sample containers, and to prepare the chains of custody.
- Chemical (blue) ice packs were not used to store samples, food, or drinks.

## 3.2.2 Field Clothing and Personal Protective Equipment

- The sampling personnel wore field clothing made of synthetic and natural fibers (preferably cotton). The clothing had to have been laundered at least six times without using a fabric softener since it was purchased. New clothing was not allowed because it could contain PFAS-related treatments.
- Only rain gear made from polyurethane and wax-coated materials was allowed.
- Clothing or boots containing Gore-Tex<sup>TM</sup> was not allowed because it consists of a PFAS membrane.
- Tyvek<sup>®</sup> clothing was not allowed on site because it contains fluorinated compounds.
- Disposable nitrile gloves were worn at all times when field activities were being conducted, and a new pair was donned prior to the following activities at each sample location:
  - Decontamination of reusable sampling equipment;
  - Contact with sample bottles or water containers;
  - Insertion of anything into the well (HDPE tubing, water depth probes, etc.);
  - Insertion of silicon tubing into the peristaltic pump;
  - Completion of monitoring well purging;
  - Sample collection; and
  - Handling of any quality assurance/QC samples, including field blanks and equipment blanks.
- A new pair of nitrile gloves was worn after handling any nondedicated sampling equipment, after contact with surfaces that had not been decontaminated, or when field personnel thought it was necessary.

#### 3.2.3 Sample Containers

- All samples were collected in polypropylene or HDPE bottles with screw caps made of the same materials. The liners of lined screw caps were not made of Teflon<sup>®</sup> and did not contain PFASs.
- Glass sample containers were not used.
- Container labels were completed using a Sharpie<sup>®</sup> pen after the caps had been placed on each bottle.

#### 3.2.4 Wet Weather

- Field personnel who were sampling during rainy conditions wore appropriate clothing that did not pose a risk of cross-contamination. Sampling personnel avoided synthetic gear treated with water-repellent finishes containing PFASs. Only rain gear made from polyurethane and wax-coated materials was allowed.
- Field personnel wore gloves when erecting or moving a gazebo tent overtop used for protection from rain at sampling locations because the canopy material may have been treated with a PFAS-based coating. Gloves were changed immediately after handling the tent, and any further contact with the tent was avoided until all sampling activities were finished and the team was ready to move on to the next sample location.

## **3.2.5** Equipment Decontamination

Field sampling equipment, including oil/water interface meters and water level indicators, were decontaminated using Alconox<sup>®</sup> or Liquinox<sup>®</sup> soap. Decon 90<sup>®</sup> was not used during decontamination activities. Laboratory-certified PFAS-free water was used for the final decontamination rinse of sampling

equipment. Larger equipment, such as drill rigs, was decontaminated using potable water and a high-pressure washer and then rinsed with potable water.

#### 3.2.6 Personnel Hygiene

- Field personnel did not use cosmetics, moisturizers, hand cream, or other related products as part of their personal hygiene routine before a sampling event because these products may contain surfactants and be a potential source of PFASs.
- Because many manufactured sunblock and insect repellents contain PFASs, only sunblock and insect repellents that contain 100% natural ingredients were allowed.
- For restroom breaks, field personnel left the exclusion zone (EZ) before removing personal protective equipment (PPE). Before returning to the EZ, field personnel washed as normal, allowing extra time to rinse with water after using soap. Field personnel used a mechanical dryer to avoid using paper towels if possible.

#### 3.2.7 Food Considerations

Field personnel did not eat or drink inside the EZ.

#### 3.2.8 Visitors

Site visitors remained outside the EZ during all sampling activities.

#### **3.3** FORMER FIRE TRAINING AREA 1 (AFFF AREA 1)

The media of concern at FTA 1 are surface soil, subsurface soil, and groundwater. No storm drains or ditches are within the vicinity of FTA 1, and surface water apparently drains to the surrounding subsurface at the area. Therefore, no surface water or sediment samples were collected at FTA 1.

#### 3.3.1 Sample Locations

Surface and subsurface soil samples were collected from DPT soil borings at three locations (SHAW01-001, SHAW01-002, and SHAW01-003) arranged in a triangular pattern over the area of the former burn pit. Groundwater samples were collected from three existing wells (MW-105, MW-121A, and MW-122A) on the downgradient (east) side of the former burn pit. Surface soil samples were collected from the top 6 inches of soil, and subsurface soil samples were collected within 2 feet of the water saturated/ unsaturated soil interface, a depth of 2 to 4 feet bgs at FTA 1. The sample locations for AFFF Area 1 are shown on Figure 3 (Appendix A).

#### 3.3.2 Soils

Soil borings SHAW01-001, SHAW01-002, and SHAW01-003 were all terminated at 5.0 feet bgs within the Quaternary sediments of the surficial aquifer. The soils encountered in the borings consisted of Unified Soil Classification System (USCS) codes SM (silty sands) and CH (sandy fat clay). Detailed boring logs are presented in Appendix C.

#### 3.3.3 Groundwater Flow

Depth to groundwater measurements were taken in the three groundwater monitoring wells on January 29, 2018. The groundwater depth measurements are presented in Appendix F and ranged from 11.97 to 13.85 feet bgs (groundwater surface elevations ranged from 200.59 to 202.10 feet NAVD88). Figure 3 (Appendix A) shows the potentiometric surface contours developed from these measurements. The contours indicate that the groundwater flow direction at AFFF Area 1 is to the east.

## 3.3.4 Analytical Results

Five surface soil samples (three primary, one field duplicate, and one composite physiochemical sample); five subsurface soil samples (three primary, one field duplicate, and one composite physiochemical sample); and four groundwater samples (three primary and one field duplicate sample) were submitted to the project laboratory for analyses from AFFF Area 1. The laboratory case narrative, data validation report, and laboratory data sheets are presented in Appendix D.

#### Surface Soil

PFBS was not detected in any surface soil samples from AFFF Area 1. PFOA was detected in three of the four surface soil samples, but none of the concentrations exceeded the screening levels. PFOS was detected in all four surface soil samples, and three samples exceeded the screening level of  $126 \mu g/kg$  for soil. The results ranged from an estimated concentration of  $140 \mu g/kg$  in duplicate sample SHAW01-001-SS-901 to an estimated concentration of  $360 \mu g/kg$  in sample SHAW01-001-SS-001. Table 3 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the surface soil samples. Figure 9 (Appendix A) shows the sample locations and the results of PFBS, PFOA, and PFOS in soil at AFFF Area 1.

#### Subsurface Soil

PFBS was not detected in any of the subsurface soil samples for AFFF Area 1. PFOA was detected in two of the four samples, but none of the concentrations exceeded the screening levels for soil. PFOS was detected in all four samples. Two samples exceeded the soil screening value of  $126 \mu g/kg$  (SHAW01-001-SO-002 at an estimated concentration of 960  $\mu g/kg$  and duplicate sample SHAW01-001-SO-902 at an estimated concentration of 280  $\mu g/kg$ ). Table 4 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the subsurface soil samples. Figure 9 (Appendix A) shows the sample locations and the results of PFBS, PFOA, and PFOS in soil at AFFF Area 1.

#### <u>Groundwater</u>

PFBS, PFOA, and PFOS were detected in all four groundwater samples from AFFF Area 1. PFBS did not exceed the screening value (40  $\mu$ g/L) in any samples. PFOA and PFOS exceeded the individual screening value (0.07  $\mu$ g/L) in all four groundwater samples. The combined concentrations of PFOA and PFOS in all four samples also exceeded the screening level (combined concentration of 0.07  $\mu$ g/L), with combined concentrations ranging from 1.492  $\mu$ g/L to 26.88  $\mu$ g/L. Table 5 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the groundwater samples. Figure 10 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in groundwater at AFFF Area 1.

#### Physiochemical Sample

To provide basic soil parameter information, composite surface and subsurface soil samples were collected from AFFF Area 1 soil borings and analyzed for pH, TOC, percent solids, and grain size. The surface soil sample (SHAW01-004-SS-001) was composed of aliquots of surface soil (0 to 6 inches bgs) collected from the borings. The subsurface soil sample (SHAW01-004-SO-004) was composed of aliquots of the subsurface soil collected from the borings immediately above the water saturated/

unsaturated soil interface (approximately 2 to 4 feet bgs). The results of the analyses of the physiochemical sample are presented in Appendix E.

#### 3.3.5 Conclusions

Former FTA 1 was reportedly closed prior to 1970. However, discrepancies exist in the documentation on the years of operation and whether AFFF was used at the area. During the SI, samples were collected where concentrations of PFAS compounds would most likely be detected based on surface drainage patterns and the groundwater flow direction. The results for the analyses of the surface and subsurface soil samples indicated that concentrations of PFOS remain in the soil above the screening criteria. Further, PFOA and PFOS were detected in all four groundwater samples at concentrations exceeding the individual and combined screening levels. Based on the analytical results, a release of AFFF to the surface soil, subsurface soil, and groundwater at AFFF Area 1 has been confirmed.

Field Sa	ample ID	SHAW01-001-SS-001	SHAW01-001-SS-901 (Field Duplicate)	SHAW01-002-SS-001	SHAW01-003-SS-001
Parameter	Screening Level (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)
PFBS	130,000ª	0.48 U	0.46 U	0.49 U	0.42 U
PFOA	126 <sup>b</sup>	6.8	5.1	3.3	0.66 U
PFOS	126 <sup>b</sup>	360 J	140 J	180	82

#### Table 3 AFFF Area 1 (Former Fire Training Area 1) Surface Soil Analytical Results

Notes: A bold value indicates the concentration was detected above the method detection limit. A shaded value exceeded the corresponding screening level. <sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

J = estimated value

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

U = parameter not detected at the method detection limit

ID = identification PFBS = perfluorobutane sulfonate PFOS = perfluorooctane sulfonate

SS = surface soil

#### Table 4 AFFF Area 1 (Former Fire Training Area 1) Subsurface Soil Analytical Results

Field Sa	ample ID	SHAW01-001-SO-002	SHAW01-001-SO-902 (Field Duplicate)	SHAW01-002-SO-003	SHAW01-003-SO-002
Depth (	feet bgs)	2–3	2–3	3–4	2–3
Parameter	Screening Level (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)
PFBS	130,000 <sup>a</sup>	0.49 U	0.60 U	0.48 U	0.48 U
PFOA	126 <sup>b</sup>	2.3 J	0.97 J	0.76 U	0.76 U
PFOS	126 <sup>b</sup>	960 J	280 J	91	64

Note: A bold value indicates the concentration was detected above the method detection limit. A shaded value exceeds the corresponding screening level. <sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

SO = subsurface soil

bgs = below ground surface

J = estimated value

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

U = parameter not detected at the method detection limit

Field Sam	ple ID	SHAW01-MW105- GW-019	SHAW01-MW105- GW-919 (Field Duplicate)	SHAW01-MW121A- GW-022	SHAW01-MW122A- GW-026
Parameter	Screening Level (µg/L)	Concentration (µg/L)	Concentration (µg/L)	Concentration (µg/L)	Concentration (µg/L)
PFBS	40 <sup>a</sup>	0.040	0.034	0.085 J	0.063 J
PFOA	0.07 <sup>b</sup>	0.096	0.092	0.88	2.9
PFOS	0.07 <sup>b</sup>	1.4	1.4	26	5.4
PFOA + PFOS	0.07 <sup>b</sup>	1.496	1.492	26.88	8.3

Table 5 AFFF Area 1 (Former Fire Training Area 1) Groundwater Analytical Results

Notes: A bold value indicates the concentration was detected above the method detection limit. A shaded value indicates the parameter exceeded the corresponding screening level.

<sup>a</sup>EPA Regional Screening Levels for Tap Water (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup> EPA, May 2016a. Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS) and EPA, May 2016b. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA). Note: When PFOA and PFOS are both present, the combined detected concentrations of the compounds are compared with the 0.07 µg/L HA value.

µg/L micrograms per liter

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

GW = groundwater J = estimated value PFOA = perfluorooctanoic acid SHAW = Shaw Air Force Base

## 3.4 FORMER FIRE TRAINING AREA 2 (AFFF AREA 2)

The media of concern at former FTA 2 are subsurface soil and groundwater. At the time of the field effort for the SI, the former FTA 2 area was used to store fill material, so the ground surface had been regularly disturbed by vehicle traffic and the placement and removal of fill material. Therefore, no surface soil samples were collected in AFFF Area 2. No storm drains or ditches are within the vicinity of FTA 2, and surface water apparently drains to the surrounding subsurface at the area. Therefore, no surface water or sediment samples were collected in AFFF Area 2.

# 3.4.1 Sample Locations

Subsurface soil samples were collected from DPT soil borings at three locations (SHAW02-001, SHAW02-002, and SHAW02-003) arranged in a triangular pattern over the area of the former burn pit. Subsurface soil samples were collected within 2 feet of the water saturated/unsaturated soil interface. Groundwater samples were collected from temporary wells installed in the borings and screened in the uppermost water-bearing zone (surficial aquifer). All three temporary wells were installed to a depth of 25 feet bgs with 10 feet of prepacked screens. The sample locations for AFFF Area 2 are shown on Figure 4 (Appendix A).

## 3.4.2 Soils

Soil borings SHAW02-001, SHAW02-002, and SHAW02-003 were all terminated at 25.0 feet bgs within the Quaternary sediments of the surficial aquifer. The soils encountered in the borings consisted of USCS codes SC (clayey sands), SW (well-graded sands), and SP (poorly graded sands). Detailed boring logs are contained in Appendix C.

## 3.4.3 Groundwater Flow

Depth to groundwater measurements were taken on January 29, 2018, in the three temporary wells at AFFF Area 2. The groundwater depth measurements are presented in Appendix F and ranged from 17.66 to 18.08 feet bgs (groundwater surface elevations ranged from 204.80 to 204.87 feet NAVD88). The depth to groundwater measurements from Area 2 and from the wells in adjacent AFFF Areas 3 and 4 were combined to develop potentiometric surface contours. Figure 4 (Appendix A) shows the potentiometric surface contours developed from these measurements. The contours indicate that the groundwater flow direction at AFFF Area 2 is to the southeast.

## 3.4.4 Analytical Results

Four subsurface soil samples (three primary samples and one composite physiochemical sample) and three groundwater samples were submitted to the project laboratory for analyses from AFFF Area 2. The laboratory case narrative, data validation report, and laboratory data sheets are presented in Appendix D.

## <u>Subsurface Soil</u>

PFBS was not detected in any subsurface soil samples. PFOA was detected in one sample, but the concentration did not exceed the screening levels. PFOS was detected in all three subsurface soil samples, but none of the concentrations exceeded the screening level. Table 6 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the subsurface soil samples. Figure 11 (Appendix A) shows the sample locations and the results of PFBS, PFOA, and PFOS in soil at AFFF Area 2.

#### **Groundwater**

PFBS, PFOA, and PFOS were detected in one or more groundwater samples from AFFF Area 2. PFBS did not exceed the screening value (40  $\mu$ g/L) in any sample. PFOA was detected in all three groundwater samples, and one sample (SHAW02-003-GW-020 at 0.10  $\mu$ g/L) exceeded the screening value of 0.07  $\mu$ g/L. PFOS concentrations in all three samples exceeded the screening level (0.07  $\mu$ g/L), with concentrations ranging from 0.071  $\mu$ g/L to 3.4  $\mu$ g/L. The combined concentrations of PFOA and PFOS in all three samples exceeded the EPA HA (combined concentration for PFOA and PFOS of 0.07  $\mu$ g/L), with concentrations ranging from 0.105  $\mu$ g/L to 3.50  $\mu$ g/L. Table 7 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the groundwater samples. Figure 12 (Appendix A) shows sample locations and results of PFBS, PFOA, and PFOS in groundwater at AFFF Area 2.

#### Physiochemical Sample

To provide basic soil parameter information, a composite subsurface soil sample was collected from AFFF Area 2 soil borings and analyzed for pH, TOC, percent solids, and grain size. The subsurface soil sample (SHAW02-004-SO-018) was composed of aliquots of the subsurface soil from the borings immediately above the water saturated/ unsaturated soil interface (between 19 and 22 feet bgs). The results of the analyses of the physiochemical samples are presented in Appendix E.

#### 3.4.5 Conclusions

Former FTA 2 was used for firefighter training from 1970 until 1981, and an unknown volume of AFFF was released in the area. During the SI, samples were collected where concentrations of PFBS, PFOA, and PFOS were most likely to be detected based on surface drainage patterns and the groundwater flow direction. The results for the analyses of the subsurface soil samples did not indicate concentrations of PFBS, PFOA, and PFOS remain in the soil in excess of the screening criteria. However, the combined concentrations of PFOS and PFOA in all three groundwater samples exceeded the EPA HA screening level. Based on the analytical results, a release of AFFF that has impacted the groundwater at AFFF Area 2 has been confirmed.

Field Sa	Field Sample ID SHA		SHAW02-002-SO-021	SHAW02-003-SO-019
Depth (	feet bgs)	18–19	21–22	19–20
	Screening Level	Concentration	Concentration	Concentration
Parameter	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
PFBS	130,000 <sup>a</sup>	0.47 U	0.55 U	0.50 U
PFOA	126 <sup>b</sup>	0.57 J	0.88 U	0.80 U
PFOS	126 <sup>b</sup>	19	0.66 J	1.0

#### Table 6 AFFF Area 2 (Former FTA 2) Subsurface Soil Analytical Results

Notes: A bold value indicates the concentration was detected above the method detection limit.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate bgs = below ground surface

SHAW = Shaw Air Force Base

bgs = below ground surfaceJ = estimated value

PFOA = perfluorooctanoic acid

SO = subsurface soil

U = parameter not detected at the method detection limit

#### Table 7 AFFF Area 2 (Former FTA 2) Groundwater Analytical Results

Field Sample ID		SHAW02-001-GW-021	SHAW02-002-GW-022	SHAW02-003-GW-020
Screening		Concentration	Concentration	Concentration
Parameter	Level (µg/L)	(µg/L)	(µg/L)	(µg/L)
PFBS	40 <sup>a</sup>	0.010 J	0.015 U	0.038 J
PFOA	0.07 <sup>b</sup>	0.034	0.021	0.10
PFOS	0.07 <sup>b</sup>	0.071	0.43	3.4
PFOA + PFOS	0.07 <sup>b</sup>	0.105	0.451	3.50

Notes: A bold value indicates the parameter was detected above the method detection limit. A shaded value indicates the detected concentration exceeded the corresponding screening limit.

<sup>b</sup> EPA, May 2016a. *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)* and EPA, May 2016b. *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*. Note: When PFOA and PFOS are both present, the combined detected account of the compounds are compared with the 0.07 µg/L health advisory value.

concentrations of the compounds are compared with the 0.07  $\mu$ g/L health advisory value.

μg/L micrograms per liter	GW = groundwater
ID = identification	J = estimated value
PFBS = perfluorobutane sulfonate	PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate	SHAW = Shaw Air Force Base
II - normaton not detected at the method detection limit	

U = parameter not detected at the method detection limit

# 3.5 FORMER FIRE TRAINING AREA 3 / CURRENT EXPLOSIVE ORDNANCE DISPOSAL AREA (AFFF AREA 3)

The media of concern at former FTA 3/Current EOD Area are surface soil, subsurface soil, and shallow groundwater. No storm drains or ditches are within the vicinity of AFFF Area 3, and surface water apparently drains to the surrounding subsurface in the area. Therefore, no surface water or sediment samples were collected for AFFF Area 3.

## 3.5.1 Sample Locations

Surface and subsurface soil samples were collected from DPT soil borings at three locations (SHAW03-001, SHAW03-002, and SHAW03-003) arranged in a triangular pattern over the area of the former burn pit. Groundwater samples were collected from the temporary wells installed in the borings and screened in the uppermost water-bearing zone (surficial aquifer) and from an existing groundwater monitoring well (FT3-MW5) on the downgradient (south) side of the former burn pit. Surface soil samples were collected from the top 6 inches of soil, and subsurface soil samples were collected within 2 feet of the water saturated/ unsaturated soil interface. Temporary wells SHAW03-MW001, SHAW03-MW002, and SHAW03-MW003 were installed to a depth of 20.0 feet bgs. The sample locations for AFFF Area 3 are shown on Figure 5 (Appendix A).

## 3.5.2 Soils

Soil samples were collected from three DPT borings in AFFF Area 3. All three borings were terminated at 20.0 feet bgs in Quaternary sediments of the surficial aquifer. The soils encountered in the borings consisted of USCS codes SC (clayey sand), CL (sandy lean clay), and SW (well graded sands). Detailed boring logs are in Appendix C.

## 3.5.3 Groundwater Flow

Depth to groundwater measurements were taken in the three temporary wells and the existing well at AFFF Area 3 on January 29, 2018. The groundwater depth measurements are presented in Appendix F and ranged from 12.30 to 13.78 feet bgs (groundwater surface elevations ranged from 202.88 to 203.41 feet NAVD88). The depth to groundwater measurements from Area 3 and from the wells in adjacent AFFF Areas 2 and 4 were combined to develop potentiometric surface contours. Figure 5 (Appendix A) shows the potentiometric surface contours developed from these measurements. The contours indicate that the groundwater flow direction at AFFF Area 3 is to the southeast.

## 3.5.4 Analytical Results

Four surface soil samples (three primary samples and one composite physiochemical sample), four subsurface soil samples (three primary samples and one composite physiochemical sample), and five groundwater samples (four primary samples and a field duplicate) were submitted to the project laboratory for analyses from AFFF Area 3. The laboratory case narrative, data validation report, and laboratory data sheets are presented in Appendix D.

#### <u>Surface Soil</u>

PFBS was detected in one sample, but the concentration did not exceed the screening level. PFOA was detected in three samples, but none of the concentrations exceeded the screening level of  $126 \mu g/kg$ .

PFOS was detected in three surface soil samples from AFFF Area 3, but only one sample (SHAW03-002-001 at 740  $\mu$ g/kg) exceeded the screening level of 126  $\mu$ g/kg for soil. Table 8 presents the screening values and analytical results of PFBS, PFOA, and PFOS detected in the surface soil samples. Figure 13 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in surface soil at AFFF Area 3.

#### Subsurface Soil

PFBS and PFOA were detected in two subsurface soil samples, but the concentrations did not exceed screening levels. PFOS was detected in all three samples, and the concentrations in two samples (SHAW03-001-SO-016 at 170  $\mu$ g/kg and SHAW03-003-SO-016 at 200  $\mu$ g/kg) exceeded the screening level of 126  $\mu$ g/kg for soil. Table 9 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the subsurface soil samples. Figure 13 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in subsurface soil at AFFF Area 3.

#### <u>Groundwater</u>

PFBS, PFOA, and PFOS were detected in all five groundwater samples from AFFF Area 3. The concentration of PFBS did not exceed the screening level in any samples. The individual concentrations for PFOA and PFOS and the combined concentrations of PFOA and PFOS exceeded the screening level (0.07  $\mu$ g/L) in all five samples. The combined PFOA and PFOS concentrations ranged from 0.81  $\mu$ g/L to 43  $\mu$ g/L. Table 10 presents the screening values and analytical results of PFBS, PFOA, and PFOS detected in the groundwater samples. Figure 14 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in groundwater at AFFF Area 3.

#### Physiochemical Sample

To provide basic soil parameter information, composite surface and subsurface soil samples were collected from AFFF Area 3 soil borings and analyzed for pH, TOC, percent solids, and grain size. The surface soil sample (SHAW03-004-SS-001) was composed of aliquots of surface soil (0 to 6 inches bgs) from the borings. The subsurface soil sample (SHAW03-004-SO-016) was composed of aliquots of the subsurface soil from the borings (between 16 and 18 feet bgs) immediately above the water saturated/ unsaturated soil interface. The results of the analyses of the physiochemical samples are presented in Appendix E.

## 3.5.5 Conclusions

AFFF was reportedly released in the burn pit at former FTA 3/ Current EOD Area during firefighter training exercises from 1981 to 1989; however, the quantities of AFFF discharged in the area are unknown. During the SI, samples were collected where concentrations of PFBS, PFOA, and PFOS would most likely be detected based on surface drainage patterns and the groundwater flow direction. The results for the analyses of the surface and subsurface soil samples indicated that concentrations of PFOS remained in the surface and subsurface soil in excess of the screening criteria. Also, the individual and combined concentrations of PFOA and PFOS were detected in all five groundwater samples at concentrations exceeding the screening levels. Based on the analytical results, a release of AFFF that has impacted the surface soil, subsurface soil, and groundwater at AFFF Area 3 has been confirmed.

Field Sam	Field Sample ID		SHAW03-002-SS-001	SHAW03-003-SS-001
	Screening Level	Concentration	Concentration	Concentration
Parameter	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
PFBS	130,000 <sup>a</sup>	0.49 U	0.48 J	0.44 U
PFOA	126 <sup>b</sup>	6.6	12	4.1
PFOS	126 <sup>b</sup>	13	740	47

Table 8 AFFF Area 3 (Former Fire Training Area 3/ Current Explosive Ordnance Disposal Area) Surface Soil Analytical Results

Notes: A bold value indicates the parameter was detected at or above the method detection limit.

A shaded value indicates that the concentration exceeded the corresponding screening level.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

J = estimated value

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

U = parameter not detected at the method detection limit

ID = identification PFBS = perfluorobutane sulfonate PFOS = perfluoroctane sulfonate SS = surface soil

#### Table 9 AFFF Area 3 (Former Fire Training Area 3/ Current Explosive Ordnance Disposal Area) Subsurface Soil Analytical Results

Field Sample ID		SHAW03-001-SO-016	SHAW03-002-SO-017	SHAW03-003-SO-016
Depth (feet bgs)		16–17	17–18	16–17
Parameter	Screening Level (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)
PFBS	130,000 <sup>a</sup>	0.95 J	0.50 U	8.3
PFOA	126 <sup>b</sup>	4.5	0.79 U	19
PFOS	126 <sup>b</sup>	170	0.96 J	200

Note: A bold value indicates the parameter was detected at or above the method detection limit.

A shaded value indicates that the concentration exceeded the corresponding screening level.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

SO = subsurface soil

bgs = below ground surface J= estimated value

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

U = parameter not detected at the method detection limit

Field Sa	mple ID	SHAW03-FT3- MW5-GW-016	SHAW03-FT3- MW5-GW-916 (field duplicate)	SHAW03-001- GW-018	SHAW03-002- GW-017	SHAW03-003- GW-018
Parameter	Screening Level (µg/L)	Concentration (µg/L)	Concentration (µg/L)	Concentration (µg/L)	Concentration (µg/L)	Concentration (µg/L)
PFBS	40 <sup>a</sup>	0.16 J	0.12	0.95	0.18	18
PFOA	0.07 <sup>b</sup>	3.3	3.2	1.7	0.17	13
PFOS	0.07 <sup>b</sup>	21	20	14	0.64	30
PFOA + PFOS	0.07 <sup>b</sup>	24.3	23.2	15.7	0.81	43

Table 10 AFFF Area 3 (Former Fire Training Area 3/ Current Explosive Ordnance Disposal Area) Groundwater Analytical Results

Notes: A bolded value indicates parameter was detected above the method detection limit.

A shaded value indicates that the concentration exceeded the corresponding screening level.

<sup>a</sup>EPA Regional Screening Levels for Tap Water (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup> EPA, May 2016a. *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)* and EPA, May 2016b. *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*. Note: When PFOA and PFOS are both present, the combined concentrations of the compounds are compared with the 0.07 µg/L health advisory value.

 $\mu g/L = micrograms per liter$ 

- ID = identification
- PFBS = perfluorobutane sulfonate
- PFOS = perfluorooctane sulfonate

GW = groundwater J = estimated value PFOA = perfluorooctanoic acid SHAW = Shaw Air Force Base

## 3.6 CURRENT FIRE TRAINING AREA (AFFF AREA 4)

The media of concern at the current FTA are surface soil, subsurface soil, shallow groundwater on the east side of the area, and surface water and sediment at the holding pond outfall.

## 3.6.1 Sample Locations

Surface soil, subsurface soil, and groundwater samples were collected from DPT soil borings at three locations (SHAW04-001, SHAW04-002, and SHAW04-003) arranged in a triangular pattern over the low-lying area adjacent to the east side of the holding pond. A surface water and sediment sample were collected at the outfall of the holding pond. Surface soil samples were collected from the top 6 inches of soil, and subsurface soil samples were collected within 2 feet of the water saturated/unsaturated soil interface. Groundwater samples were collected from temporary wells installed in the borings and screened in the uppermost water-bearing zone (surficial aquifer). All three temporary wells were installed at 20 feet bgs with 10 feet of prepacked screens. The sample locations for AFFF Area 4 are shown on Figure 6 (Appendix A).

## 3.6.2 Soils

Soil samples were collected from three DPT borings in AFFF Area 4. All three borings (SHAW04-001, SHAW04-002, and SHAW04-003) were terminated at 20.0 feet bgs. All three borings were drilled in Quaternary sediments of the surficial aquifer. The soils encountered in the borings consisted of USCS codes SP (poorly graded sands) and SC (clayey sand). Detailed boring logs are in Appendix C.

## 3.6.3 Groundwater Flow

Depth to groundwater measurements were taken in the three temporary wells on January 29, 2018. The groundwater depth measurements are presented in Appendix F and ranged from 11.10 to 11.35 feet bgs (groundwater surface elevations ranged from 203.07 to 203.49 feet NAVD88). The depth to groundwater measurements from Area 4 and from the wells in adjacent AFFF Areas 2 and 3 were combined to develop potentiometric surface contours. Figure 6 (Appendix A) shows the potentiometric surface contours developed from these measurements. The contours indicate that the groundwater flow direction at AFFF Area 4 is to the southeast.

## 3.6.4 Analytical Results

Four surface soil samples (three primary and one composite physiochemical sample); five subsurface soil samples (three primary, one field duplicate sample, and one composite physiochemical sample); three groundwater samples; two sediment samples (one primary sample and field duplicate sample); and two surface water samples (one primary sample and a field duplicate sample) were submitted to the project laboratory for analyses from AFFF Area 4. The laboratory case narrative, data validation report, and laboratory data sheets are presented in Appendix D.

## Surface Soil

PFBS was not detected in the surface soil samples from Area 4. PFOA was detected in one sample, but the concentration did not exceed the screening level of  $126 \,\mu\text{g/kg}$ . PFOS was detected in three surface soil samples, but none of the concentrations exceeded the screening level of  $126 \,\mu\text{g/kg}$ . Table 11 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the surface soil samples. Figure

15 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in surface soil at AFFF Area 4.

#### Subsurface Soil

PFBS was not detected in any subsurface soil samples. PFOA was detected in one sample, but the concentration did not exceed the screening level of  $126 \mu g/kg$ . PFOS was detected in four subsurface soil samples from AFFF Area 4, but none of the concentrations exceeded the screening level of  $126 \mu g/kg$ . Table 12 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the subsurface soil samples. Figure 15 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in subsurface soil at AFFF Area 4.

#### <u>Groundwater</u>

PFBS, PFOA, and PFOS were detected in the three groundwater samples from AFFF Area 4. None of the concentrations of PFBS exceeded the screening level (40  $\mu$ g/L). Individual concentrations of PFOA and PFOS exceeded the screening value of 0.07  $\mu$ g/L in all three samples. The combined concentrations of PFOA and PFOS in all three groundwater samples also exceeded the EPA HA for drinking water (combined PFOA and PFOS value of 0.07  $\mu$ g/L), with concentrations ranging from 5.1  $\mu$ g/L to 8.9  $\mu$ g/L. Table 13 presents the screening values and analytical results of PFBS, PFOA, and PFOS detected in the groundwater samples. Figure 16 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in groundwater at AFFF Area 4.

#### <u>Sediment</u>

PFBS was not detected in either the primary or duplicate sediment sample from AFFF Area 4. PFOA and PFOS were detected in both samples, but the concentration did not exceed the screening level of 126  $\mu$ g/kg. Table 14 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the sediment samples. Figure 15 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in sediment at AFFF Area 4.

#### Surface Water

PFBS, PFOA, and PFOS were detected in both the primary and duplicate surface water sample from AFFF Area 4. PFBS did not exceed the screening level (40  $\mu$ g/L) in either sample. Individual concentrations of PFOA and PFOS exceeded the screening value of 0.07  $\mu$ g/L in both samples. The combined concentrations of PFOA and PFOS in both surface water samples also exceeded the EPA HA for drinking water (combined PFOA and PFOS value of 0.07  $\mu$ g/L), with concentrations of 0.80  $\mu$ g/L and 0.85  $\mu$ g/L. Table 15 presents the screening values and analytical results of PFBS, PFOA, and PFOS detected in the surface water samples. Figure 16 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in surface water at AFFF Area 4.

#### Physiochemical Sample

To provide basic soil parameter information, composite surface and subsurface soil samples were collected from AFFF Area 4 soil borings and analyzed for pH, TOC, percent solids, and grain size. The surface soil sample (SHAW04-005-SS-001) was composed of aliquots of surface soil (0 to 6 inches bgs) from the borings. The subsurface soil sample (SHAW04-005-SO-013) was composed of aliquots of the subsurface soil from the borings (13 to 14 feet bgs) immediately above the water saturated/ unsaturated soil interface. The results of the analyses of the physiochemical samples are presented in Appendix E.

#### 3.6.5 Conclusions

Annual certification testing of the AFFF systems on the Shaw AFB fire trucks is conducted at the current FTA. Although the AFFF foam is discharged into the lined holding pond, it is possible that an unknown quantity of water containing elevated concentrations of PFASs may have been released through the outfall piping from the pond to the low-lying area adjacent to the south side of the FTA. During the SI, samples were collected where concentrations of PFBS, PFOA, and PFOS would most likely be detected based on surface drainage patterns and the groundwater flow direction. The results for the analyses of the surface soil, subsurface soil, and sediment samples did not indicate concentrations of PFBS, PFOA, or PFOS remained in the soil or sediment in excess of the screening criteria. However, combined concentrations of PFOA and PFOS were detected in the groundwater and surface water samples at concentrations exceeding the EPA HA. Based on the analytical results, a release of AFFF to the groundwater and surface water at AFFF Area 4 has been confirmed.

Field Sample ID		SHAW04-001-SS-001 SHAW04-002-SS-001		SHAW04-003-SS-001	
Parameter	Screening Level (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	
PFBS	130,000ª	0.44 U	0.50 U	0.46 U	
PFOA	126 <sup>b</sup>	0.90	0.80 U	0.73 U	
PFOS	126 <sup>b</sup>	27	6.2	11	

#### Table 11 AFFF Area 4 (Current Fire Training Area) Surface Soil Analytical Results

Note: A bold value indicates the parameter was detected at or above the method detection limit.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

SS = surface soil

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

ID = identification

U = parameter not detected at the method detection limit

#### Table 12 AFFF Area 4 (Current Fire Training Area) Subsurface Soil Analytical Results

Field Sa	ample ID	SHAW04-001-SO-013	SHAW04-002-SO-013	SHAW04-002-SO-913 (Field Duplicate)	SHAW04-003-SO-012
Depth	(feet bgs)	13–14	13–14	13–14	13–14
	Screening	Concentration	Concentration	Concentration	Concentration
Parameter	Level (µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
PFBS	130,000 <sup>a</sup>	0.44 U	0.45 U	0.49 U	0.49 U
PFOA	126 <sup>b</sup>	0.78 J	0.71 U	0.78 U	0.78 U
PFOS	126 <sup>b</sup>	3.4	1.4 J	11 J	6.3

Note: A bold value indicates the parameter was detected at or above the method detection limit.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms \ per \ kilogram$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

SO = subsurface soil

bgs = below ground surface

J = estimated value PFOA = perfluorooctanoic acid

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

U = parameter not detected at the method detection limit

Field Sample ID		SHAW04-001-GW-018	SHAW04-002-GW-018	SHAW04-003-GW-015
	Screening Level	Concentration	Concentration	Concentration
Parameter	(µg/L)	(µg/L)	(µg/L)	(µg/L)
PFBS	40 <sup>a</sup>	0.26	0.30	0.098
PFOA	0.07 <sup>b</sup>	4.7	1.2	0.60
PFOS	0.07 <sup>b</sup>	4.2	3.9	7.9
PFOA + PFOS	0.07 <sup>b</sup>	8.9	5.1	8.50

Table 13 AFFF Area 4 (Current Fire Training Area) Groundwater Analytical Results

Notes: A bold value indicates the parameter was detected at or above the method detection limit. A shaded value indicates the detected concentration exceeded the corresponding screening level.

<sup>a</sup>EPA Regional Screening Levels for Tap Water (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup> EPA, May 2016a. *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)* and EPA, May 2016b. *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*. Note: When PFOA and PFOS are both present, the combined detected concentrations of the compounds are compared with the 0.07 µg/L Health Advisory value.

 $\mu g/L = micrograms per liter$ 

ID = identification

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

GW = groundwater PFBS = perfluorobutane sulfonate PFOS = perfluorooctane sulfonate

#### Table 14 AFFF Area 4 (Current Fire Training Area) Sediment Analytical Results

Field Sample ID		SHAW04-004-SD-001	SHAW04-004-SD-901 (Field Duplicate)
Parameter	Screening Level (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)
PFBS	130,000ª	0.50 Ŭ	0.70 U
PFOA	126 <sup>b</sup>	0.40 J	1.1 J
PFOS	126 <sup>b</sup>	26 J	67 J

Note: A bold value indicates the parameter was detected at or above the method detection limit.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms \ per \ kilogram$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

 $\mathbf{U} = \mathbf{parameter} \ \mathbf{not} \ \mathbf{detected} \ \mathbf{at} \ \mathbf{the} \ \mathbf{method} \ \mathbf{detection} \ \mathbf{limit}$ 

bgs = below ground surface J = estimated value PFOA = perfluorooctanoic acid SD = sediment

SHAW = Shaw Air Force Base

Field Sa	mple ID	SHAW04-004-SW-001	SHAW04-004-SW-901 (Field Duplicate)		
Parameter	Screening Level	Concentration	Concentration		
I al allicter	(µg/L)	(µg/L)	(µg/L)		
PFBS	40 <sup>a</sup>	0.045	0.037		
PFOA	0.07 <sup>b</sup>	0.18	0.17		
PFOS	0.07 <sup>b</sup>	0.67	0.63		
PFOA + PFOS	0.07 <sup>b</sup>	0.85	0.80		

Table 15 AFFF Area 4 (Current Fire Training Area) Surface Water Analytical Results

Notes: A bold value indicates the parameter was detected at or above the method detection limit. A shaded value indicates the detected concentration exceeded the corresponding screening level.

<sup>a</sup>EPA Regional Screening Levels for Tap Water (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup> EPA, May 2016a. *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)* and EPA, May 2016b. *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*. Note: When PFOA and PFOS are both present, the combined detected concentrations of the compounds are compared with the 0.07 µg/L Health Advisory value.

 $\mu g/L = micrograms per liter$ 

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

SW = surface water

ID = identification PFOA = perfluorooctanoic acid SHAW = Shaw Air Force Base

# 3.7 BUILDING 1511 (AFFF AREA 5)

The media of concern at Building 1511 are surface soil, subsurface soil, and shallow groundwater. No surface water or sediment samples were collected for the area because no surface water features are near the building, and surface water runoff apparently flows off the paved areas to the surrounding grassy areas and infiltrates to the subsurface.

# 3.7.1 Sample Locations

Surface soil and subsurface soil samples were collected from DPT soil borings at four locations. One DPT boring (SHAW05-001) was installed at the rear door of the building near the AFFF tank where multiple small releases have reportedly occurred. The second DPT boring (SHAW05-002) was installed adjacent to the holding tank at the north end of the building, where overflows of the tank were reported. The third and fourth DPT borings (SHAW05-003 and SHAW05-004) were installed on the grass infield southeast of the building, where surface runoff collects. Groundwater samples were collected from temporary wells installed in three borings, but the temporary well installed in SHAW05-MW001 was dry and did not produce enough water to sample. Surface soil samples were collected from the top 6 inches of soil, and subsurface soil samples were collected within 2 feet of the water saturated/unsaturated soil interface. Groundwater samples were collected from temporary wells installed in the borings and screened in the uppermost water-bearing zone (surficial aquifer). Temporary well SHAW05-MW001 was installed at a depth of 25.5 feet bgs with 15 feet of prepacked screen, but it never produced any water. The other three temporary wells (SHAW05-MW002, SHAW05-MW003, and SHAW05-MW004) were installed at 35.0 feet bgs. Well SHAW05-MW002 was also installed with 15 feet of prepacked screen, but wells SHAW05-MW003 and SHAW05-MW004 were installed with 10 feet of prepacked screen. The sample locations for AFFF Area 5 are shown on Figure 7 (Appendix A).

# 3.7.2 Soils

Soil samples were collected from four DPT borings in AFFF Area 5. All four borings were drilled in Quaternary sediments of the surficial aquifer. Soil boring SHAW05-001 was terminated at 25.5 feet bgs and soil borings SHAW05-002, SHAW05-003, and SHAW05-004 were terminated at 35.0 feet bgs. The soils encountered in the borings consisted of USCS codes GC (clayey gravel), CL (sandy lean clay), SP (poorly graded sand), SW (well graded sand), and SC (clayey sand). Detailed boring logs are in Appendix C.

# 3.7.3 Groundwater Flow

Depth to groundwater measurements were taken in three temporary wells on January 31, 2018. Temporary well SHAW05-MW001 never produced sufficient water to measure. The groundwater depth measurements are presented in Appendix F and ranged from 25.39 to 28.10 feet bgs (groundwater surface elevations ranged from 217.55 to 227.00 feet NAVD88). Figure 7 (Appendix A) shows the potentiometric surface contours developed from these measurements. The contours indicate that the groundwater flow direction at AFFF Area 5 is to the southeast.

# 3.7.4 Analytical Results

Six surface soil samples (four primary samples, one field duplicate sample, and one composite physiochemical sample); five subsurface soil samples (four primary samples and one composite physiochemical sample); and three groundwater samples were submitted to the project laboratory for

analyses from AFFF Area 5. The laboratory case narrative, data validation report, and laboratory data sheets are presented in Appendix D.

### Surface Soil

PFBS was not detected in the surface soil samples from Area 5. PFOA was detected in three samples, but the concentration did not exceed the screening level of 126  $\mu$ g/kg. PFOS was detected in all five surface soil samples, but none of the concentrations exceeded the screening level of 126  $\mu$ g/kg. Table 16 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the surface soil samples. Figure 17 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in surface soil at AFFF Area 5.

## Subsurface Soil

PFBS was not detected in the subsurface soil samples from Area 5. PFOA was detected in one sample, but the concentration did not exceed the screening level of  $126 \mu g/kg$ . PFOS was detected in three of the four subsurface soil samples from AFFF Area 5, but the concentrations did not exceed the screening level of  $126 \mu g/kg$ . Table 17 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the subsurface soil samples. Figure 17 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in subsurface soil at AFFF Area 5.

## <u>Groundwater</u>

PFBS, PFOA, and PFOS were detected in all three groundwater samples from AFFF Area 5. None of the concentrations of PFBS in the samples exceeded the screening level (40  $\mu$ g/L). Individual concentrations of PFOA and PFOS exceeded the screening value of 0.07  $\mu$ g/L in all three samples. The combined concentrations of PFOA and PFOS in all three groundwater samples also exceeded the EPA HA for drinking water (combined PFOA and PFOS value of 0.07  $\mu$ g/L), with concentrations ranging from 0.162  $\mu$ g/L to 0.586  $\mu$ g/L. Table 18 presents the screening values and analytical results of PFBS, PFOA, and PFOS detected in the groundwater samples. Figure 18 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in groundwater at AFFF Area 5.

### Physiochemical Sample

To provide basic soil parameter information, composite surface and subsurface soil samples were collected from AFFF Area 5 soil borings and analyzed for pH, TOC, percent solids, and grain size. The surface soil sample (SHAW05-005-SS-001) was composed of aliquots of surface soil (0 to 6 inches bgs) from the borings. The subsurface soil sample (SHAW05-005-SO-031) was composed of aliquots of the subsurface soil from the borings either immediately above the water saturated/ unsaturated soil interface (between 28 and 30 feet bgs) (borings SHAW05-003 and SHAW05-004) or within 2 feet of the total depth of the boring if no groundwater was encountered (borings SHAW05-001 and SHAW05-002). The results of the analyses of the physiochemical samples are presented in Appendix E.

# 3.7.5 Conclusions

Conversations with base personnel indicate that there may have been multiple small releases from the AFFF tank system at Building 1511 and overflow from the holding tank. Based on this information, SCDHEC requested that the building be added to the SI process. During the SI, samples were collected where concentrations of PFBS, PFOA, and PFOS would most likely be detected based on surface water drainage patterns and the groundwater flow direction. The results for the analyses of the surface and subsurface soil samples do not indicate concentrations of PFBS, PFOA, or PFOS remain in the soil in excess of the screening criteria. However, the combined concentrations of PFOA and PFOS were detected in all three groundwater samples at concentrations exceeding the EPA HA. Based on the analytical results, a release of AFFF to the groundwater at AFFF Area 5 has been confirmed.

Field	Sample ID	SHAW05-001-SS-001	SHAW05-002-SS-001	SHAW05-002-SS-901 (Field Duplicate)	SHAW05-003-SS-001	SHAW05-004-SS-001
Parameter	Screening Level (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)
PFBS	130,000 <sup>a</sup>	0.44 U	0.50 U	0.48 U	0.50 U	0.55 U
PFOA	126 <sup>b</sup>	1.0	0.76 J	0.60 J	0.80 U	0.88 U
PFOS	126 <sup>b</sup>	1.7	1.6	1.6	6.2	5.1

#### Table 16 AFFF Area 5 (Building 1511) Surface Soil Analytical Results

Note: A bold value indicates the parameter was detected above the method detection limit.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

J = estimated value

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

U = parameter not detected at the method detection limit

ID = identification PFBS = perfluorobutane sulfonate PFOS = perfluorooctane sulfonate SS = surface soil

#### Table 17 AFFF Area 5 (Building 1511) Subsurface Soil Analytical Results

Field Sa	ample ID	SHAW05-001-SO-024 SHAW05-002-SO-034		SHAW05-003-SO-027	SHAW05-004-SO-028	
Depth (	(feet bgs)	24–25 34–35		27–28	28–29	
Parameter	Screening Level (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	Concentration (µg/kg)	
PFBS	130,000 <sup>a</sup>	0.43 U	0.44 U	0.43 U	0.50 U	
PFOA	126 <sup>b</sup>	0.76 J	0.70 U	0.68 U	0.80 U	
PFOS	126 <sup>b</sup>	20	0.70 U	0.26 J	0.78 J	

Note: A bold value indicates the parameter was detected above the method detection limit.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

SO = subsurface soil

bgs = below ground surface

J = estimated value

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base U = parameter not detected at the method detection limit

Field Sa	mple ID	SHAW05-002-GW-033	SHAW05-003-GW-032	SHAW05-004-GW-031	
Parameter	Screening Level (µg/L)	Concentration (µg/L)	Concentration (µg/L)	Concentration (µg/L)	
PFBS	$40^{\mathrm{a}}$	0.017 J	0.058	0.021	
PFOA	0.07 <sup>b</sup>	0.12	0.076	0.082	
PFOS	0.07 <sup>b</sup>	0.18	0.51	0.080	
PFOA + PFOS	0.07 <sup>b</sup>	0.30	0.586	0.162	

Table 18 AFFF Area 5 (Building 1511) Groundwater Analytical Results

Notes: A bold value indicates the parameter was detected above the method detection limit. A shaded value indicates the detected concentration exceeded the corresponding screening level.

<sup>a</sup>EPA Regional Screening Levels for Tap Water (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup> EPA, May 2016a. *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)* and EPA, May 2016b. *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*. Note: When PFOA and PFOS are both present, the combined detected concentrations of the compounds are compared with the 0.07 µg/L Health Advisory value.

 $\mu g/L = micrograms per liter$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

GW = groundwater J = estimated value PFOA = perfluorooctanoic acid SHAW = Shaw Air Force Base

## 3.8 WASTEWATER TREATMENT PLANT (AFFF AREA 6)

The media of concern at the WWTP are surface soil, subsurface soil, and groundwater. There are no surface water features near the WWTP; therefore, no surface water or sediment samples were collected in Area 6.

### 3.8.1 Sample Locations

Surface soil, subsurface soil, and groundwater samples were collected from three DPT soil borings. One DPT boring (SHAW06-001) was installed at the northeast end of the sludge drying beds. The second DPT boring (SHAW06-002) was installed on the south end of the sludge drying beds. The third DPT boring (SHAW06-003) was installed west of the sludge drying beds, adjacent to clarifying tanks. The sample locations for AFFF Area 6 are shown on Figure 8 (Appendix A).

## **3.8.2** Soils

Soil samples were collected from three DPT borings in AFFF Area 6. Soil boring SHAW06-001 was terminated at 33.0 feet bgs on DPT refusal. Soil boring SHAW06-002 was terminated at 30.0 feet bgs. Soil boring SHAW06-003 was terminated at 28.0 feet bgs. All three borings were drilled in Quaternary sediments of the surficial aquifer. The soils encountered in the borings consisted of USCS codes SC (clayey sand), CL (sandy clay), SP (poorly graded sand), SM (silty sand), and CH (fat clay). Detailed boring logs are in Appendix C.

### 3.8.3 Groundwater Flow

Depth to groundwater measurements were taken in the three temporary wells on January 29, 2018. The groundwater depth measurements are presented in Appendix F and ranged from 24.0 to 27.17 feet bgs (groundwater surface elevations ranged from 280.15 to 280.30 feet NAVD88). The depth to groundwater measurements were used to develop potentiometric surface contours. Figure 8 (Appendix A) shows the potentiometric surface contours developed from these measurements. The contours indicate that the groundwater flow direction at AFFF Area 6 is to the west.

### 3.8.4 Analytical Results

Four surface soil samples (three primary and one composite physiochemical sample), four subsurface soil samples (three primary samples and one composite physiochemical sample), and three groundwater samples were submitted to the project laboratory for analyses from AFFF Area 6. The laboratory case narrative, data validation report, and laboratory data sheets are presented in Appendix D.

### Surface Soil

PFBS was not detected in the surface soil samples from Area 6. PFOA was detected in two samples, but the concentrations did not exceed the screening level of 126  $\mu$ g/kg. PFOS was detected in all three surface soil samples, but none of the concentrations exceeded the screening level of 126  $\mu$ g/kg. Table 19 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the surface soil samples. Figure 19 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in surface soil at AFFF Area 6.

### Subsurface Soil

PFBS and PFOA were not detected in the subsurface soil samples from Area 6. PFOS was detected in two subsurface soil samples from AFFF Area 6, but the concentrations did not exceed the screening level of 126  $\mu$ g/kg. Table 20 presents the screening values and analytical results of PFBS, PFOA, and PFOS in the subsurface soil samples. Figure 19 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in subsurface soil at AFFF Area 6.

### <u>Groundwater</u>

PFBS, PFOA, and PFOS were detected in all three groundwater samples from AFFF Area 6. None of the concentrations of PFBS in the samples exceeded the screening level (40  $\mu$ g/L). Individual concentrations of PFOA and PFOS exceeded the screening value of 0.07  $\mu$ g/L in all three samples. The combined concentrations of PFOA and PFOS in all three groundwater samples also exceeded the EPA HA for drinking water (combined PFOA and PFOS value of 0.07  $\mu$ g/L), with concentrations ranging from 0.40  $\mu$ g/L to 0.80  $\mu$ g/L. Table 21 presents the screening values and analytical results of PFBS, PFOA, and PFOS detected in the groundwater samples. Figure 20 (Appendix A) shows the sample locations and results of PFBS, PFOA, and PFOS in groundwater at AFFF Area 6.

### Physiochemical Sample

To provide basic soil parameter information, composite surface and subsurface soil samples were collected from AFFF Area 6 soil borings and analyzed for pH, TOC, percent solids, and grain size. The surface soil sample (SHAW06-004-SS-001) was composed of aliquots of surface soil (0 to 6 inches bgs) from the borings. The subsurface soil sample (SHAW06-004-SO-027) was composed of aliquots of the subsurface soil from the borings immediately above the water saturated/ unsaturated soil interface (between 26 and 29 feet bgs). The results of the analyses of the physiochemical samples are presented in Appendix E.

# 3.8.5 Conclusions

AFFF released in the hangar area of the base would be carried through the sanitary sewer system to the WWTP. An unknown volume of treated water and sludge containing PFAS residue may have been placed on the sludge drying beds. During the SI, samples were collected where concentrations of PFBS, PFOA, and PFOS would most likely be detected based on surface water drainage patterns and groundwater flow direction. The results for the analyses of the surface and subsurface soil samples do not indicate concentrations of PFBS, PFOA, or PFOS remain in the soil in excess of the screening criteria. However, the combined concentrations of PFOA and PFOS exceeded the EPA HA in all three groundwater samples. Based on the analytical results, a release of AFFF to the groundwater at AFFF Area 6 has been confirmed.

Field Sample	ID	SHAW06-001-SS-001	SHAW06-002-SS-001	SHAW06-003-SS-001	
Parameter	Parameter Screening Level (µg/kg)		Concentration (µg/kg)	Concentration (µg/kg)	
PFBS	130,000 <sup>a</sup>	0.49 U	0.50 U	0.55 U	
PFOA	126 <sup>b</sup>	0.78 U	1.5	1.4	
PFOS	126 <sup>b</sup>	5.1	45	33	

Table 19 AFFF Area 6 (Wastewater Treatment Plant) Surface Soil Analytical Results

Note: A bold value indicates the parameter was detected above the method detection limit.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

SS = surface soil

PFOA = perfluorooctanoic acid

ID = identification

SHAW = Shaw Air Force Base

U = parameter not detected at the method detection limit

#### Table 20 AFFF Area 6 (Wastewater Treatment Plant) Subsurface Soil Analytical Results

Field Sample 1	D	SHAW06-001-SO-028	SHAW06-002-SO-026	SHAW06-003-SO-026	
Depth (feet bg	s)	28–29	26–27	26–27	
	Screening		Concentration	Concentration	
Parameter	Level (µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	
PFBS	130,000 <sup>a</sup>	0.65 U	0.55 U	0.60 U	
PFOA	126 <sup>b</sup>	1.0 U	0.88 U	0.96 U	
PFOS	126 <sup>b</sup>	0.83 J	1.0 J	0.96 U	

Note: A bold value indicates the parameter was detected at or above the method detection limit.

<sup>a</sup>EPA Regional Screening Levels for Residential Soil (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup>Screening levels calculated using the EPA Regional Screening Level calculator (https://epa-prgs.ornl.gov/cgi-bin/ chemicals/ csl\_search).

 $\mu g/kg = micrograms per kilogram$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

SO = subsurface soil

bgs = below ground surface

J = estimated value

PFOA = perfluorooctanoic acid

SHAW = Shaw Air Force Base

U = parameter not detected at the method detection limit

Field Sar	mple ID	SHAW06-001-GW-033	SHAW06-002-GW-028	SHAW06-003-GW-027
	Screening Level	Concentration	Concentration	Concentration
Parameter	(µg/L)	(µg/L)	(µg/L)	(µg/L)
PFBS	$40^{a}$	0.038	0.027	0.064
PFOA	0.07 <sup>b</sup>	0.30	0.19	0.18
PFOS	0.07 <sup>b</sup>	0.50	0.21	0.30
PFOA + PFOS	0.07 <sup>b</sup>	0.80	0.40	0.48

Table 21 AFFF Area 6 (Wastewater Treatment Plant) Groundwater Analytical Results

Notes: A bold value indicates the parameter was detected at or above the method detection limit. A shaded value indicates the detected concentration exceeded the corresponding screening level.

<sup>a</sup>EPA Regional Screening Levels for Tap Water (May 2018) (https://semspub.epa.gov/work/HQ/197235.pdf).

<sup>b</sup> EPA, May 2016a. *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)* and EPA, May 2016b. *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)*. Note: When PFOA and PFOS are both present, the combined detected concentrations of the compounds are compared with the 0.07 µg/L Health Advisory value.

 $\mu g/L = micrograms per liter$ 

ID = identification

PFBS = perfluorobutane sulfonate

PFOS = perfluorooctane sulfonate

GW = groundwater J = estimated value PFOA = perfluorooctanoic acid SHAW = Shaw Air Force Base

## 3.9 INVESTIGATION-DERIVED WASTE

The QAPP addendum (ASL, February 2017) included prescribed procedures for handling and analyses of investigation-derived waste (IDW) generated during the SI. After the QAPP addendum was approved, the USAF provided revised guidance on handling IDW disposal to minimize waste generation. In accordance with this guidance, the minimal soil and water generated during the field activities was placed on the ground adjacent to, and downgradient from, each sampling location. General waste – such as paper, plastic, trash, and PPE – was contained in plastic garbage bags and placed in on-base dumpsters for disposal.

# 4.0 GROUNDWATER PATHWAY

Shaw AFB is within the Atlantic Coastal Plain Physiographic Province of South Carolina. The province is divided into three subprovinces: Upper, Middle, and Lower Coastal Plain. The subprovinces are separated by scarps, changes in elevation that represent ancient depositional or erosional regimes. Shaw AFB lies along the border between the Upper and Middle Coastal Plain subprovinces. The Orangeburg Scarp in the western portion of the base is the demarcation line between the Upper and Middle subprovinces. The Upper Coastal Plain is characterized by deeply incised streams on a rolling topographic surface. The coastal plain sediments pinch out to the west against the soils and rocks of the Piedmont Physiographic Province. The Middle and Lower Coastal Plain subprovinces have much lower relief than the Upper Coastal Plain, and terrace deposits cover the surface of these two subprovinces. Each terrace represents the approximate shoreline at the time the terrace formed.

The topography at Shaw AFB is flat in the east, changing to rolling hills in the west. The terrain is a flat terrace surface in the vicinity of the runways and rises approximately 100 feet to roughly 300 feet above mean sea level (amsl) on the western edge of the base perimeter. Beyond the western base boundary, the land surface drops down across Beech Creek at approximately 200 feet amsl and then rises back to more than 300 feet amsl on the west side of the creek.

The geologic units underlying Shaw AFB are the Duplin Formation terrace deposits (Pliocene/ Pleistocene), the Lang Syne and Sawdust Landing Members of the Black Mingo Formation (Paleocene), and the Black Creek Formation (late Cretaceous). A subsurface extension of the Orangeburg Scarp on the west side of the base creates an unconformity dipping to the east, dividing the younger Duplin Formation from the older Black Mingo and Black Creek deposits in the central and eastern portions of the base. Figure 21 (Appendix A) presents a generalized cross-section of the geologic formations at Shaw AFB. The individual formations are described from oldest to youngest here (Rust, February 1995).

*Black Creek Formation* – The Black Creek Formation is subdivided into the Upper Black Creek and Lower Black Creek units. The units are separated by a dense clay layer (known as the "100-foot clay") that is approximately 25 feet thick in the eastern portion of the base and thins to the west beneath the Orangeburg Scarp. The clay is encountered at 100 to 220 feet bgs depending on the elevation of the land surface. Both units of the Black Creek Formation consist of sand, often clayey with pyrite and organic materials and represent a near-shore deltaic terrestrial depositional environment. The units may be laterally discontinuous and cross-cut locally by more permeable sands and gravel where channel deposits have been laid down. The top of the Black Creek Formation is encountered at 140 to 240 feet bgs (depending on surface elevation). The base of the Black Creek Formation is marked by the presence of a dark gray to black organic clay. This clay separates the Black Creek Formation from the underlying Middendorf Formation. In the area of the Orangeburg Scarp, the base of the Black Creek Formation is approximately 320 feet bgs. Black Mingo Group – The Black Mingo Group consists of the Sawdust Landing and Lang Syne Formations. The Sawdust Landing Formation is comprised primarily of interbedded silt, clay, and clayey sand. The Sawdust Landing Formation is generally encountered between elevations of 170 and 260 feet amsl (60 to 70 feet bgs), and the thickness of the formation ranges from approximately 100 feet in the western portion of the base to nonexistent in the eastern portion of the base, where erosion along the Orangeburg Scarp has occurred. On the Orangeburg Scarp, the top of the Sawdust Landing Formation is approximately 55 feet bgs. The Lang Syne Formation is comprised predominantly of unconsolidated sand, silt, and clay. Lenses of iron-cemented sandstone and gravel layers are also encountered, often near the base of the unit. The Lang Syne is present only in the western half of Shaw AFB and outcrops on the Orangeburg Scarp at an elevation of approximately 260 to 270 feet amsl. The thickness of the formation ranges from a few feet along its eastern limits to approximately 100 feet on the western edge of Shaw AFB. The Lang Syne Formation positioned on the hill overlooking Shaw AFB forms one of the two surficial aquifers at Shaw AFB. The aquifer features a radial groundwater flow pattern with a steep hydraulic gradient to the southwest and southeast. The aquifer is recharged from precipitation and discharges to springs and seeps along the Beech Creek Valley to the west and to the Duplin Formation to the east. The silts and clays of the Sawdust Landing member below the Lang Syne serve as a confining unit separating the Lang Syne aquifer from the aquifers in the Black Creek Formation.

*Duplin Formation* – Beginning at the Orangeburg Scarp and going east, the Duplin Formation overlays the older geologic units. The Duplin Formation consists predominantly of interlayered poorly sorted to well-sorted and clayey, coarse- to fine-grained sands with occasional localized clay layers. The thickness of the Duplin Formation ranges from a few feet in the western portion of the base to more than 70 feet in the eastern portion of Shaw AFB. The Duplin Formation forms the second of two surficial aquifers at Shaw AFB. Recharge to the Duplin aquifer occurs directly from precipitation and as seepage from the edge of the Lang Syne aquifer along the edge of the Orangeburg Scarp. The Duplin aquifer discharges to the Upper Black Creek aquifer beneath it and to springs and streams beyond the southeastern edge of the base property.

The combined surficial aquifer systems extend from the ground surface to approximately 80 to 90 feet bgs and are divided hydrogeologically into upper and lower zones. The upper zone extends approximately 35 feet bgs and generally flows east-northeast into Long Branch. The lower zone extends from approximately 35 feet bgs to a semipermeable aquitard (the 100-foot clay) at approximately 90 to 100 feet bgs and generally flows east-southeast. The Black Creek aquifer (consisting of upper and lower units separated by the semipermeable 100-foot clay) underlies most of Sumter County and provides drinking water for the majority of the central Coastal Plain. Six water supply wells provide drinking water for Shaw AFB. Five wells are screened in the Black Creek aquifer, and the sixth well (Well 4) is screened in the deeper Middendorf aquifer system. At Shaw AFB, the Upper Black Creek aquifer is encountered at an elevation of approximately 175 feet amsl in the western portion of the base but is absent in the eastern portion of the base. The Lower Black Creek aquifer is encountered at Shaw AFB at an elevation of approximately 100 feet amsl. Recharge to the Black Creek aquifer is from the east and northeast through general downward leakage from overlying units (Duplin aquifer). Previous reports indicate that the potentiometric surface in the Black Creek aquifer is relatively flat but with a flow direction to the west and north discharging into the Wateree River approximately 8 miles west of Shaw AFB (Rust, February 1995).

Shaw AFB has six drinking water supply wells on base serving approximately 4,120 on-base personnel (CH2M Hill, October 2015). A search of the Federal Public Water Supply Database (Environmental Data Resources, Inc., September 2015) showed 12 public water wells within 4 miles of Shaw AFB, and a search of the South Carolina Well Inventory showed 81 public or private drinking water wells within a 4 mile radius of the base. Figure 22 shows the locations of the off-base public and private wells; it should

be noted that some of the posted locations contain multiple wells. Because of security concerns, the USAF does not allow the locations of on-base drinking water wells to be shown in public documents.

## 4.1 FORMER FIRE TRAINING AREA 1 (AFFF AREA 1)

Individual and combined concentrations of PFOA and PFOS exceeded screening levels in all four groundwater samples collected in AFFF Area 1. Therefore, the groundwater in the area presents a potential hazard to human health. The closest drinking water supply well is Shaw AFB Well BW-1R. This well was completed in 2016 and is not listed in the South Carolina Department of Natural Resources (SCDNR) well data base. Shaw AFB personnel indicated that this well is 621 feet in depth and is screened in the Middendorf aquifer. Well BW-1R is approximately 2,900 feet south-southwest (sidegradient) of AFFF Area 1. Multiple public and private drinking water wells are within 4 miles downgradient (north-northeast) of AFFF Area 1. The closest off-base drinking water supply well (Major Ospum Well, SCDNR Well ID SUM-152) is approximately 1 mile downgradient (east) of AFFF Area 1. The state database contains no information on the number of people served by this well or the screened interval for SUM-152, but other drinking water wells to the east of Shaw AFB and within 4 miles of AFFF Area 1 are screened in the surficial aquifer (Duplin Formation), so it can be assumed SUM-152 is as well. Therefore, based on the groundwater samples exceeding the EPA HA and the presence of drinking water supply wells screened in the surficial aquifer within 4 miles downgradient of the area, the groundwater pathway for AFFF Area 1 is potentially complete and drinking water may be impacted.

# 4.2 FORMER FIRE TRAINING AREA 2 (AFFF AREA 2)

Individual concentrations of PFOA in one sample and PFOS concentrations in all three groundwater samples in AFFF Area 2 exceeded screening levels during the SI. In addition, the combined concentrations of PFOA and PFOS exceeded screening levels in all three groundwater samples. Therefore, the groundwater in AFFF Area 2 presents a potential hazard to human health. The closest drinking water supply well is Shaw AFB Well BW-1R (total depth 621 feet bgs and not listed in the SCDNR well data base) approximately 3,300 feet south-southeast (downgradient) of AFFF Area 2. Multiple public and private drinking water wells are within 4 miles downgradient (south-southeast) of AFFF Area 2. The closest off-base drinking water supply well (Crescent Motor Home Park, SCDHEC Well ID G43194) is approximately 1 mile downgradient (southeast) of AFFF Area 2. The state database has no information on the number of people served by this well, the depth, or screened interval. However, given the depth of the other water supply wells in the area (100 feet or less bgs), it can be assumed that the well is screened within the surficial aquifer. Therefore, based on groundwater samples exceeding the EPA HA and the presence of drinking water supply wells screened in the surficial aquifer within 4 miles downgradient of the area, the groundwater pathway for AFFF Area 2 is potentially complete and drinking water may be impacted.

# 4.3 FORMER FIRE TRAINING AREA 3 / CURRENT EXPLOSIVE ORDNANCE DISPOSAL AREA (AFFF AREA 3)

Individual and combined concentrations of PFOA and PFOS exceeded screening levels in all five groundwater samples collected in AFFF Area 3 during the SI. This indicates that the groundwater in the area presents a potential hazard to human health. The closest drinking water supply well is Shaw AFB Well BW-1R (total depth 621 feet bgs and not listed in the SCDNR well data base) approximately 2,300 feet south-southeast (downgradient) of AFFF Area 3. Multiple public and private drinking water wells are within 4 miles downgradient (south-southeast) of AFFF Area 3. The closest off-base drinking water supply well (Crescent Motor Home Park, SCDHEC Well ID G43194) is approximately 0.75 mile

downgradient (southeast) of AFFF Area 3. The state database has no information on the number of people served by this well, the depth, or screened interval. However, given the depth of the other water supply wells in the area (100 feet or less bgs), it can be assumed that the well is screened within the surficial aquifer. Therefore, based on groundwater samples exceeding the EPA HA and the presence of drinking water supply wells screened in the surficial aquifer within 4 miles downgradient of the area, the groundwater pathway for AFFF Area 3 is potentially complete and drinking water may be impacted.

# 4.4 CURRENT FIRE TRAINING AREA (AFFF AREA 4)

Combined concentrations of PFOA and PFOS exceeded screening levels in all three groundwater samples collected in AFFF Area 4 during the SI. Therefore, the groundwater in AFFF Area 4 presents a potential hazard to human health. The closest drinking water supply well is Shaw AFB Well BW-1R (total depth 621 feet bgs and not listed in the SCDNR well data base) approximately 3,300 feet south-southeast (downgradient) of AFFF Area 4. Multiple public and private drinking water wells are within 4 miles downgradient (south-southeast) of AFFF Area 4. The closest off-base drinking water supply well (Crescent Motor Home Park, SCDHEC Well ID G43194) is approximately 0.75 mile downgradient (southeast) of AFFF Area 4. The state database has no information on the number of people served by this well, the depth, or screened interval. However, given the depth of the other water supply wells in the area (100 feet or less bgs), it can be assumed that the well is screened within the surficial aquifer. Therefore, based on groundwater samples exceeding the EPA HA and the presence of drinking water supply wells screened in the surficial aquifer within 4 miles downgradient of the area, the groundwater pathway for AFFF Area 4 is potentially complete and drinking water may be impacted.

# 4.5 BUILDING 1511 (AFFF AREA 5)

Combined concentrations of PFOA and PFOS exceeded screening levels in all three groundwater samples collected in AFFF Area 5 during the SI. Therefore, the groundwater in AFFF Area 5 presents a potential hazard to human health. The closest drinking water supply well is Shaw AFB Well #5A (SCDNR Well ID SUM-137), approximately 0.5 mile northwest (upgradient) of AFFF Area 5. Multiple public and private drinking water wells are within 4 miles downgradient (south-southeast) of AFFF Area 5. The closest off-base drinking water supply well (Crescent Motor Home Park, SCDHEC Well ID G43194) is approximately 1.75 miles downgradient (southeast) of AFFF Area 5. The state database has no information on the number of people served by this well, the depth, or screened interval. However, given the depth of the other water supply wells in the area (100 feet or less bgs), it can be assumed that the well is screened within the surficial aquifer. Therefore, based on groundwater samples exceeding the EPA HA and the presence of drinking water supply wells screened in the surficial aquifer within 4 miles downgradient of the area, the groundwater pathway for AFFF Area 5 is potentially complete and drinking water may be impacted.

# 4.6 WASTEWATER TREATMENT PLANT (AFFF AREA 6)

Combined concentrations of PFOA and PFOS exceeded screening levels in all three groundwater samples collected in AFFF Area 6 during the SI. Therefore, the groundwater in AFFF Area 6 presents a potential hazard to human health. Multiple public and private drinking water wells are within 4 miles downgradient (west-southwest) of AFFF Area 6. The closest drinking water supply well is the Ideal Trailer Park Well (SCDNR Well ID SUM-218), approximately 0.25 mile southwest (downgradient) of AFFF Area 6. The state database has no information on the number of people served by SUM-218, but the screened interval is shown as 203 feet bgs to 207 feet bgs. This depth would put the screened interval below clays of the Sawdust Landing Member of the Black Mingo Formation and in the Upper Black Creek Member of the

surficial aquifer. A search of the database indicates that top of the screened intervals for drinking water wells west (downgradient) of AFFF Area 6 and atop the Orangeburg Scarp are consistently more than 100 feet bgs and often exceed 200 feet bgs. Based on the general formation depths in the area, wells shallower than approximately 220 feet bgs are presumed to be screened in the Upper Black Creek Member of the surficial aquifer, and wells deeper than approximately 220 feet bgs are presumed to be screened below the 100-foot clay in the Lower Black Creek Member of the Black Creek aquifer. The groundwater samples from AFFF Area 6 exceeded the EPA HA, and many of the drinking water supply wells within 4 miles downgradient of the area are screened in the surficial aquifer. Therefore, the groundwater pathway for AFFF Area 6 is potentially complete and drinking water may be impacted.

# 5.0 SURFACE WATER AND SEDIMENT PATHWAY

Surface water features at Shaw AFB include Long Branch Creek at the northern end of the base and several ponds near the golf course. A series of canals and ditches associated with runways and taxiways was created to drain stormwater from the airfield. The base topography ranges from rolling uplands on the western side to nearly level plains with mature streams and swampy areas on the eastern side. Elevations range from about 300 feet in the northwest to about 200 feet in the southeast. Lowland areas of the base contain shallow oval depressions, trending northwest-southeast, which are known as Carolina Bays. Surface drainage from the southern portion of the base flows south into Mush Swamp and Bluffhead Branch south of the base. Drainage from the northern and eastern portions of the base flows northeast into Long Branch Creek. All streams draining the base eventually flow southeast into the Pocotaligo River. Minor amounts of interior drainage are directed to on-base ponds near the golf course. Two major naturally occurring wetland features are on Shaw AFB: Spann Branch and Long Branch (CH2M Hill, October 2015).

# 5.1 FORMER FIRE TRAINING AREA 1 (AFFF AREA 1)

No storm drains or ditches are within the vicinity of former FTA 1, and surface water drains to the subsurface in the area. Therefore, surface water and sediment were not identified as potential media of concern, and no surface water or sediment samples were collected in AFFF Area 1 during the SI.

# 5.2 FORMER FIRE TRAINING AREA 2 (AFFF AREA 2)

No storm drains or ditches are within the vicinity of former FTA 2, and surface water drains to the subsurface in the area. Therefore, surface water and sediment were not identified as potential media of concern, and no surface water or sediment samples were collected in AFFF Area 2 during the SI.

# 5.3 FORMER FIRE TRAINING AREA 3 / CURRENT EXPLOSIVE ORDNANCE DISPOSAL AREA (AFFF AREA 3)

No storm drains or ditches are within the vicinity of former FTA 3/ Current EOD Area, and surface water drains to the subsurface in the area. Therefore, surface water and sediment were not identified as potential media of concern, and no surface water or sediment samples were collected in AFFF Area 3 during the SI.

# 5.4 CURRENT FIRE TRAINING AREA (AFFF AREA 4)

A surface water sample and sediment sample were collected at the outfall of the holding pond at AFFF Area 4. PFAS compounds were not detected above screening levels in the sediment sample. However, individual and combined concentrations of PFOA and PFOS exceeded the screening levels in both the

primary and duplicate surface water sample. Therefore, the surface water leaving the holding pond in AFFF Area 4 presents a potential hazard to human health. No surface water intakes are identified adjacent to the surface water migration path within 15 miles downstream of AFFF Area 4. Therefore, there is no potential impact to drinking water from the surface water at AFFF Area 4.

# 5.5 BUILDING 1511 (AFFF AREA 5)

No storm drains or ditches are within the vicinity of Building 1511, and surface water drains to the subsurface in the area. Therefore, surface water and sediment were not identified as potential media of concern, and no surface water or sediment samples were collected in AFFF Area 5 during the SI.

# 5.6 WASTEWATER TREATMENT PLANT (AFFF AREA 6)

No storm drains or ditches are within the vicinity of the Shaw WWTP, and surface water drains to the subsurface in the area. Therefore, surface water and sediment were not identified as potential media of concern, and no surface water or sediment samples were collected in AFFF Area 6 during the SI.

# 6.0 SOIL EXPOSURE AND AIR PATHWAYS

The objective of soil sampling during the SI was to determine if concentrations of PFAS compounds exceeded the screening levels caused by release of AFFF in the individual areas. Soil screening levels were based on direct soil exposure in a residential scenario and calculated to an HQ of 0.1.

# 6.1 FORMER FIRE TRAINING AREA 1 (AFFF AREA 1)

The analytical results of the soil samples collected in AFFF Area 1 during the SI indicated that the concentrations of PFOS in surface and subsurface soil exceeded the screening values, presenting a potential hazard to human health. However, former FTA 1 is a grass-covered field that would inhibit dust emissions and direct contact with the surface and subsurface soil. Therefore, given the current use of the area, the human exposure pathway for soil (both ingestion and dust inhalation) is incomplete for AFFF Area 1.

# 6.2 FORMER FIRE TRAINING AREA 2 (AFFF AREA 2)

Because of the continued disturbance of the ground surface in the area, surface soil samples were not collected in AFFF Area 2 during the SI. The analytical results of the subsurface soil samples collected in AFFF Area 2 during the SI indicated that the concentrations of PFAS compounds were below soil screening values. Therefore, given the analytical results of the soil samples, soil at AFFF Area 2 does not present a hazard to human health.

# 6.3 FORMER FIRE TRAINING AREA 3 / CURRENT EXPLOSIVE ORDNANCE DISPOSAL AREA (AFFF AREA 3)

The analytical results of the soil samples collected from the former burn pit in AFFF Area 3 during the SI indicated that the concentrations of PFOS in the surface and subsurface soil exceeded the screening values, presenting a potential hazard to human health. However, former FTA 3 is a grass-covered field that would inhibit dust emissions and direct contact with the surface and subsurface soil. Therefore, given the current use of the area, the human exposure pathway for soil (both ingestion and dust inhalation) is incomplete for AFFF Area 3.

# 6.4 CURRENT FIRE TRAINING AREA (AFFF AREA 4)

The analytical results of the soil samples collected in AFFF Area 4 during the SI indicated that the concentrations of PFAS compounds were below soil screening values in both surface and subsurface soils. Therefore, given the analytical results of the soil samples, soil at AFFF Area 4 does not present a hazard to human health.

# 6.5 BUILDING 1511 (AFFF AREA 5)

The analytical results of the soil samples collected in AFFF Area 5 during the SI indicated that the concentrations of PFAS compounds were below soil screening values in both surface and subsurface soils. Therefore, given the analytical results of the soil samples, soil at AFFF Area 5 does not present a hazard to human health.

# 6.6 WASTEWATER TREATMENT PLANT (AFFF AREA 6)

The analytical results of the soil samples collected in AFFF Area 6 during the SI indicated that the concentrations of PFAS compounds were below soil screening values in both surface and subsurface soils. Therefore, given the analytical results of the soil samples, soil at AFFF Area 6 does not present a hazard to human health.

# 7.0 UPDATE TO CONCEPTUAL SITE MODELS

The following sections contain updates to the conceptual site models (CSMs) for AFFF Areas 1 through 6 and discuss PFOA and PFOS in soil, groundwater, surface water, and sediment. PFBS has been eliminated as a contaminant of concern based on analytical results presented in Section 3.0 and will not be discussed further.

# 7.1 FORMER FIRE TRAINING AREA 1 (AFFF AREA 1)

The CSM for AFFF Area 1 presented in the QAPP addendum (ASL, February 2017) identified surface soil, subsurface soil, and groundwater as media of concern at the location of former FTA 1. The PA identified on-site workers as potential receptors for impacted soil and on- and off-base users of impacted drinking water as potential human receptors (CH2M Hill, October 2015). Based on the findings discussed in Section 3.3, PFOS concentrations exceeded the screening level in surface and subsurface soil. However, the area is an open grass field with no residents or regular visitors, so given the current use of the area, exposure from the surface soil to human receptors is not anticipated. Based on the findings discussed in Section 4.1, combined concentrations of PFOA and PFOS in groundwater at AFFF Area 1 exceeded the EPA HA screening level of  $0.07 \mu g/L$ . Given that drinking water supply wells are screened in the surficial aquifer within 4 miles downgradient of AFFF Area 1, the drinking water may be impacted.

# 7.2 FORMER FIRE TRAINING AREA 2 (AFFF AREA 2)

The CSM for AFFF Area 2 presented in the QAPP addendum (ASL, February 2017) identified subsurface soil and groundwater as media of concern at former FTA 2. The PA identified on-site workers as potential receptors for impacted soil and on- and off-base users of impacted drinking water as potential human receptors (CH2M Hill, October 2015). Based on the findings discussed in Section 3.4, concentrations of

PFAS compounds did not exceed the screening levels in subsurface soil. Therefore, exposure from the soil to human receptors would not represent a hazard to human health. Based on the findings discussed in Section 4.2, combined concentrations of PFOA and PFOS exceeded the EPA HA screening level of 0.07  $\mu$ g/L in groundwater samples. Given that drinking water supply wells are screened in the surficial aquifer within 4 miles downgradient of AFFF Area 2, drinking water may be impacted.

# 7.3 FORMER FIRE TRAINING AREA 3 / CURRENT EXPLOSIVE ORDNANCE DISPOSAL AREA (AFFF AREA 3)

The CSM for AFFF Area 3 presented in the QAPP addendum (ASL, February 2017) identified surface soil, subsurface soil, and groundwater as media of concern at former FTA 3. The PA identified on-site workers as potential receptors for impacted soil and on- and off-base users of impacted drinking water as potential human receptors (CH2M Hill, October 2015). Based on the findings discussed in Section 3.5, concentrations of PFOS exceeded the screening level in the surface and subsurface soils representing a potential hazard to human health. However, the area is an open grass field with no residents or regular visitors, so given the current use of the area, exposure from the soil in the area to human receptors is not anticipated. Based on the findings discussed in Section 4.3, combined concentrations of PFOA and PFOS exceeded the EPA HA screening level of  $0.07 \mu g/L$  for groundwater. Given that drinking water supply wells are screened in the surficial aquifer within 4 miles downgradient of AFFF Area 3, the drinking water may be impacted.

# 7.4 CURRENT FIRE TRAINING AREA (AFFF AREA 4)

The CSM for AFFF Area 4 presented in the QAPP addendum (ASL, February 2017) identified surface soil, subsurface soil, groundwater, surface water, and sediment as media of concern at the current FTA. The PA identified on-site workers as potential receptors for impacted soil and on- and off-base users of impacted drinking water as potential human receptors (CH2M Hill, October 2015). Based on the findings discussed in Section 3.6, concentrations of PFAS compounds did not exceed screening levels in the surface and subsurface soil samples and would not represent a potential hazard to human health. Based on the findings discussed in Section 4.4, combined concentrations of PFOA and PFOS exceeded the EPA HA screening level of 0.07 µg/L in groundwater. Given that drinking water supply wells are screened in the surficial aquifer within 4 miles downgradient of AFFF Area 4, the drinking water may be impacted.

# 7.5 BUILDING 1511 (AFFF AREA 5)

The CSM for AFFF Area 5 presented in the QAPP addendum (ASL, February 2017) identified surface soil, subsurface soil, and groundwater as media of concern at Building 1511. The PA did not identify any potential receptors for any media from Building 1511 (CH2M Hill, October 2015). Based on the findings discussed in Section 3.7, concentrations of PFAS compounds did not exceed the screening levels in the surface and subsurface soils and do not represent a potential hazard to human health. Based on the findings discussed in Section 4.5, combined concentrations of PFOA and PFOS exceeded the EPA HA screening level of 0.07  $\mu$ g/L for groundwater. Given that drinking water supply wells are screened in the surficial aquifer within 4 miles downgradient of AFFF Area 5, the drinking water may be impacted.

# 7.6 WASTEWATER TREATMENT PLANT (AFFF AREA 6)

The CSM for AFFF Area 6 presented in the QAPP addendum (ASL, February 2017) identified surface soil, subsurface soil, and groundwater as media of concern at the WWTP. The PA (CH2M Hill, October 2015) did not evaluate the WWTP. Based on the findings discussed in Section 3.8, concentrations of PFAS compounds did not exceed the screening levels in surface and subsurface soils and do not represent a potential hazard to human health. Based on the findings discussed in Section 4.6, combined

concentrations of PFOA and PFOS exceeded the EPA HA screening level of 0.07  $\mu$ g/L for groundwater. Given that drinking water supply wells are screened in the surficial aquifer within 4 miles downgradient of AFFF Area 6, the drinking water may be impacted.

# 8.0 SUMMARY AND CONCLUSIONS

The PA (CH2M Hill, October 2015) identified four AFFF areas at Shaw AFB requiring additional evaluation through the SI process based on the reported or suspected release of AFFF material containing PFAS compounds.

- AFFF Area 1 Former FTA 1 (ERP Site FT-01),
- AFFF Area 2 Former FTA 2 (ERP Site FT-07),
- AFFF Area 3 Former FTA 3 / Current EOD Area (ERP Site FT-06), and
- AFFF Area 4 Current FTA (not a previously identified ERP site).

Two areas that were not previously identified ERP sites were also added to the SI.

- AFFF Area 5 Building 1511 (added at the request of SCDHEC and not a previously identified ERP site), and
- AFFF Area 6 WWTP (added at the request of AFCEC and not a previously identified ERP site).

Media evaluated during the SI included surface soil (0 to 6 inches in depth), subsurface soil (vadose zone in the source area), groundwater (samples from temporary and permanent groundwater wells), surface water, and sediment. The objectives of the SI were to

- determine if a confirmed release of PFOS, PFOA, or PFBS has occurred at AFFF areas selected for inspection;
- determine if PFOS or PFOA are present in groundwater or surface water in the areas at concentrations exceeding the EPA lifetime HA;
- determine if PFBS is present in groundwater or surface water in the areas at concentrations exceeding the EPA RSLs;
- determine if PFOA or PFOS is present in soil or sediment in the areas at concentrations exceeding the calculated RSLs;
- determine if PFBS is present in soil or sediment in the areas at concentrations exceeding the EPA RSLs; and
- identify potential receptor pathways with immediate impacts to human health (immediate impact to human health is considered consumption of drinking water with PFOS or PFOA above the HA or PFBS above the RSL).

All samples were analyzed for PFBS, PFOA, and PFOS using modified EPA Method 537. Soil and sediment PFBS analytical results were compared to published EPA RSLs (130,000  $\mu$ g/kg for residential soil) (EPA, May 2018). PFOA and PFOS analytical results were compared to calculated RSLs (126  $\mu$ g/kg for both PFOA and PFOS). Groundwater and surface water PFBS analytical results were compared to the published EPA RSL (40  $\mu$ g/L for tap water); PFOA and PFOS analytical results were compared to the EPA HA (for tap water) of 0.07  $\mu$ g/L for the individual and combined concentrations of PFOA and PFOS.

Table 22 presents a summary of the maximum detected concentrations of PFBS, PFOA, and PFOS for each media in the six areas; indicates where those concentrations exceeded the corresponding screening levels; and provides recommendations for the next activities in each area. The maximum detected concentrations of PFBS did not exceed the screening criteria in any media in any of the six areas. However, all six AFFF areas had concentrations of PFOA and/or PFOS in one or more media that exceeded the corresponding screening levels. Potential impacts to human health were identified in all six

AFFF areas at Shaw AFB based on the results of the analyses of groundwater samples and the presence of drinking water supply wells within 4 miles downgradient of each area.

AFFF Area	Associated Existing ERP Site	Parameter	Maximum Detected Concentration	Screening Value	Units	*Number of Samples / Number of Exceedances	Exceeds Screening Value	Potentially Complete DW Exposure Pathway	Recommendation
		Surface Soil (0 t	to 6 inches)						
		PFBS	ND	130,000	µg/kg	3 / 0	No		
		PFOA	6.8	126	µg/kg	3 / 0	No		
		PFOS	360 J	126	µg/kg	3 / 2	Yes		
		Subsurface Soil							
AFFF Area 1		PFBS	ND	130,000	µg/kg	3 / 0	No		Expanded SI followed by an RI
Former FTA 1	FT-01	PFOA	2.3 J	126	µg/kg	3 / 0	No	Yes	
Former FTA 1		PFOS	960 J	126	µg/kg	3/1	Yes	165	
		Groundwater							
		PFBS	0.085 J	40	µg/L	3 / 0	No	-	
		PFOA	2.9	0.07	µg/L	3/3	Yes		
		PFOS	26	0.07	µg/L	3/3	Yes		
		PFOA + PFOS	26.88	0.07	µg/L	3/3	Yes		
		Subsurface Soil							
		PFBS	ND	130,000	µg/kg	3 / 0	No		
		PFOA	0.57 J	126	µg/kg	3 / 0	No		
AFFF Area 2		PFOS	19	126	µg/kg	3 / 0	No		Expanded SI
Former FTA 2	FT-07	Groundwater						Yes	followed by an RI
Former FIA 2		PFBS	0.038 J	40	µg/L	3 / 0	No		Ionoweu Dy all KI
		PFOA	0.10	0.07	µg/L	3/1	Yes		
		PFOS	3.4	0.07	µg/L	3/3	Yes		
		PFOA + PFOS	3.50	0.07	µg/L	3/3	Yes		

 Table 22 Summary of Analytical Results and Screening Level Exceedances

AFFF Area	Associated Existing ERP Site	Parameter	Maximum Detected Concentration	Screening Value	Units	*Number of Samples / Number of Exceedances	Exceeds Screening Value	Potentially Complete DW Exposure Pathway	Recommendation
		Surface Soil (0 t	to 6 inches bgs)						
		PFBS	0.48 J	130,000	µg/kg	3 / 0	No		
		PFOA	12	126	µg/kg	3 / 0	No		
		PFOS	740	126	µg/kg	3/1	Yes		
		Subsurface Soil							
AFFF Area 3		PFBS	8.3	130,000	µg/kg	3 / 0	No		E-mondod SI
Former FTA 3/ Current	FT-06	PFOA	19	126	µg/kg	3 / 0	No	Yes	Expanded SI followed by an RI
5/ Current EOD Area		PFOS	200	126	µg/kg	3/2	Yes		Ionowed by an KI
EOD Area		Groundwater							
		PFBS	18	40	µg/L	4 / 0	No		
		PFOA	13	0.07	µg/L	4 / 4	Yes		
		PFOS	30	0.07	µg/L	4 / 4	Yes	]	
		PFOA + PFOS	43	0.07	μg/L	4 / 4	Yes	]	

AFFF Area	Associated Existing ERP Site	Parameter	Maximum Detected Concentration	Screening Value	Units	*Number of Samples / Number of Exceedances	Exceeds Screening Value	Potentially Complete DW Exposure Pathway	Recommendation
		Surface Soil (0 t	to 6 inches bgs)						
		PFBS	ND	130,000	µg/kg	3 / 0	No		
		PFOA	0.90	126	µg/kg	3 / 0	No		
		PFOS	27	126	µg/kg	3 / 0	No		
		Subsurface Soil							
		PFBS	ND	130,000	µg/kg	3 / 0	No		
		PFOA	0.78 J	126	µg/kg	3 / 0	No		
		PFOS	11 J	126	µg/kg	3 / 0	No		
		Groundwater							
		PFBS	0.30	40	µg/L	3 / 0	No	- Yes	Expanded SI followed by an RI
AFFF Area 4	New site	PFOA	4.7	0.07	µg/L	3/3	Yes		
Current FTA	INEW SILE	PFOS	7.9	0.07	µg/L	3/3	Yes	105	
		PFOA + PFOS	**8.9	0.07	µg/L	3/3	Yes		
		Sediment					-	-	
		PFBS	ND	130,000	µg/kg	1 / 0	No	-	
		PFOA	1.1 J	126	µg/kg	1 / 0	No		
		PFOS	67 J	126	µg/kg	1 / 0	No	_	
		Surface Water						-	
		PFBS	0.045	40	µg/L	1 / 0	No	-	
		PFOA	0.18	0.07	µg/L	1/1	Yes		
		PFOS	0.67	0.07	µg/L	1/1	Yes		
		PFOA + PFOS	0.85	0.07	µg/L	1/1	Yes		

AFFF Area	Associated Existing ERP Site	Parameter	Maximum Detected Concentration	Screening Value	Units	*Number of Samples / Number of Exceedances	Exceeds Screening Value	Potentially Complete DW Exposure Pathway	Recommendation
		Surface Soil (0	to 6 inches)			•	•		
		PFBS	ND	130,000	µg/kg	4 / 0	No		
		PFOA	1.0	126	µg/kg	4 / 0	No		
		PFOS	6.2	126	µg/kg	4 / 0	No		
		Subsurface Soil							
AFFF Area 5		PFBS	ND	130,000	µg/kg	4 / 0	No		Expanded SI
Building 1511	New Site	PFOA	0.76 J	126	µg/kg	4 / 0	No	Yes	followed by an RI
Dunung 1311		PFOS	20	126	µg/kg	4 / 0	No		Tonowed by an KI
		Groundwater							
		PFBS	0.058	40	μg/L	3 / 0	No		
		PFOA	0.12	0.07	μg/L	3/3	Yes		
		PFOS	0.51	0.07	μg/L	3/3	Yes		
		PFOA + PFOS	**0.586	0.07	µg/L	3/3	Yes		
		Surface Soil (0 t	,			-	•		
		PFBS	ND	130,000	µg/kg	3 / 0	No		
		PFOA	1.5	126	µg/kg	3 / 0	No		
		PFOS	45	126	µg/kg	3 / 0	No		
		Subsurface Soil				-	•		
AFFF Area 6		PFBS	ND	130,000	µg/kg	3 / 0	No		Expanded SI
WWTP	New Site	PFOA	ND	126	µg/kg	3 / 0	No	Yes	followed by an RI
** ** 11		PFOS	1.0 J	126	µg/kg	3 / 0	No		Tonowed by an Ki
		Groundwater				1			
		PFBS	0.064	40	µg/L	3 / 0	No		
		PFOA	0.30	0.07	µg/L	3/3	Yes		
		PFOS	0.50	0.07	µg/L	3/3	Yes		
		PFOA + PFOS	0.80	0.07	μg/L	3/3	Yes		

\*The number of samples and exceedances do not include field duplicate samples.

\*\*The combined PFOA plus PFOS value is the highest value for a sample in the area and is not the combination of the highest individual PFOA and PFOS value for the area. Note: Bold value indicates an exceedance of the corresponding screening value.

µg/kg = micrograms per kilogram	$\mu g/L = micrograms$ per liter	AFFF = aqueous film forming foam
ERP = Environmental Restoration Program	FTA = fire training area	J = estimated value
PFBS = perfluorobutane sulfonate	PFOA = perfluorooctanoic acid	PFOS = perfluorooctane sulfonate

PFOA = perfluorooctanoic acid WWTP = Wastewater Treatment Plant

EOD = explosive ordnance disposal

DW = drinking water

ND = not detected at the method detection limit

RI = remedial investigation

SI = site inspection

# 8.1 FORMER FIRE TRAINING AREA 1 (AFFF AREA 1)

An unknown volume of AFFF was released in the area during the active life of former FTA 1. Releases of AFFF in the area have resulted in PFOS concentrations in surface and subsurface soil above the screening levels, but given current use of the area, no potential receptor pathways for the soils have been identified. Concentrations of PFOA and PFOS in groundwater exceeded the screening levels, and drinking water supply wells are within 4 miles downgradient of the area. Therefore, groundwater in AFFF Area 1 has also been impacted by the release of AFFF. This creates the potential for impact to human health. Therefore, an expanded SI followed by a remedial investigation (RI) are recommended to determine the extent of contamination at former FTA 1. It should be noted that the three existing wells sampled in AFFF Area 1 during the SI were screened in the shallow aquifer and did not evaluate the impacts to deeper zones in the aquifer system. Based on the stratigraphy in AFFF Area 1, there is a possibility for communication between the surficial aquifer and the deeper aquifers in this area. Activities recommended in the ESI should include collecting groundwater samples from deeper existing wells in AFFF Area 1 to evaluate potential impacts to the deeper aquifers in the area. In addition, since the surficial aquifer discharges to Long Branch Creek, activities recommended in the ESI should include the collection of surface water and sediment samples from Long Brach Creek.

# 8.2 FORMER FIRE TRAINING AREA 2 (AFFF AREA 2)

An unknown volume of AFFF was released in the area during the active life of former FTA 2. Surface soil was not sampled in the area because of the continued placement and removal of fill dirt in the area. PFOA and PFOS were not detected in subsurface soil at concentrations exceeding the screening levels. Releases of AFFF in the area have resulted in PFOA and PFOS concentrations in groundwater at concentrations exceeding the screening levels. Given the presence of drinking water supply wells within 4 miles downgradient of the area, there is a potential for impact to human health from the groundwater in AFFF Area 2. Therefore, an expanded SI followed by an RI are recommended to determine the extent of contamination in the area of Former FTA 2.

# 8.3 FORMER FIRE TRAINING AREA 3 / CURRENT EXPLOSIVE ORDNANCE DISPOSAL AREA (AFFF AREA 3)

An unknown volume of AFFF was released in the area during the active life of former FTA 3. Releases of AFFF in the area have resulted in PFOS concentrations in surface and subsurface soil above the screening levels, but given current use of the area, no potential receptor pathways for the soils have been identified. Releases of AFFF in the area have resulted in PFOA and PFOS concentrations in groundwater at concentrations exceeding the screening levels. Given the presence of drinking water supply wells within 4 miles downgradient of the area, there is a potential for impact to human health from the groundwater in AFFF Area 3. Therefore, an expanded SI followed by an RI are recommended to determine the extent of contamination in the area of Former FTA 3.

# 8.4 CURRENT FIRE TRAINING AREA (AFFF AREA 4)

An unknown quantity of AFFF has been discharged in AFFF Area 4 during annual foam system testing. PFOA and PFOS were not detected in surface soil, subsurface soil, or sediment samples at concentrations exceeding the screening levels. Releases of AFFF in the area have resulted in PFOA and PFOS in surface water and groundwater at concentrations exceeding the screening levels. Given the presence of drinking water supply wells within 4 miles downgradient of the area, there is a potential for impact to human health from the groundwater in AFFF Area 4. Therefore, an expanded SI followed by an RI are recommended to determine the extent of contamination in the area of the Current FTA.

## 8.5 BUILDING 1511 (AFFF AREA 5)

Interviews with base personnel indicate that an unknown volume of AFFF was released in AFFF Area 5 from multiple small releases from the AFFF tank system and from overflow at the holding tank. PFOA and PFOS were not detected in surface or subsurface soil samples at concentrations exceeding the screening levels. Releases of AFFF in the area have resulted in PFOA and PFOS concentrations in groundwater at concentrations exceeding the screening levels. Given the presence of drinking water supply wells within 4 miles downgradient of the area, there is a potential for impact to human health from the groundwater in AFFF Area 5. Therefore, an expanded SI followed by an RI are recommended to determine the extent of contamination in the area of Building 1511.

## 8.6 WASTEWATER TREATMENT PLANT (AFFF AREA 6)

Releases of AFFF in the hangar area of the base would be carried through the sanitary sewer system to the WWTP and treated waste sludge, containing an unknown quantity of AFFF material, is placed on the sludge drying beds. PFOA and PFOS were not detected in surface or subsurface soil samples at concentrations exceeding the screening levels. The groundwater in AFFF Area 6 was found to contain PFOA and PFOS concentrations exceeding the screening levels and represents a potential hazard to human health. Given the presence of drinking water supply wells within 4 miles downgradient of the area, there is a potential for impacts to human health from the groundwater in AFFF Area 6. Therefore, an expanded SI followed by an RI are recommended to determine the extent of contamination in the area of the WWTP.

# 9.0 REFERENCES

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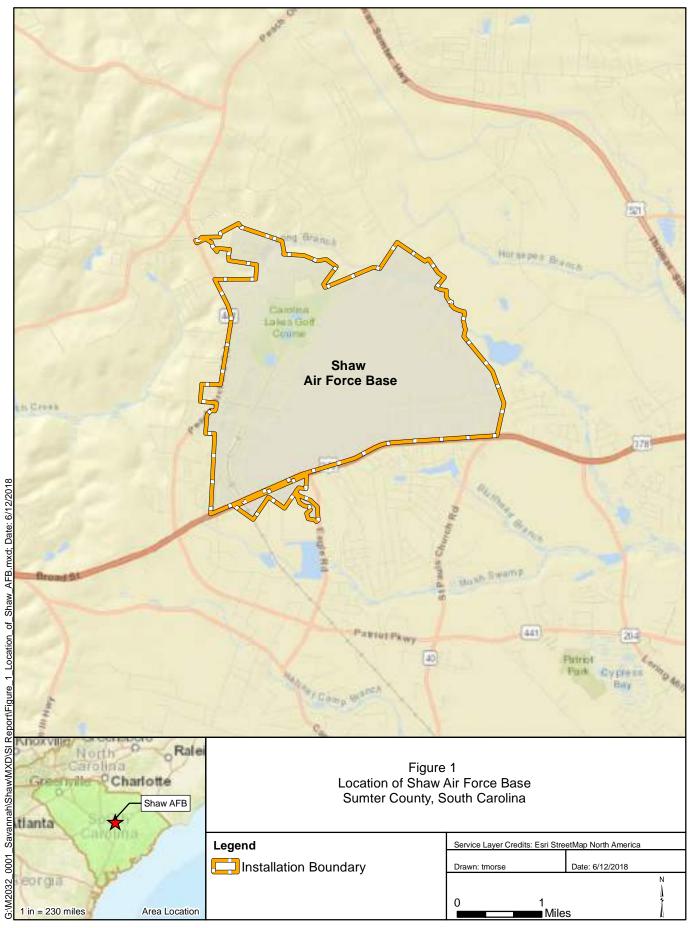
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Appendix A AFFF Area-Specific Figures

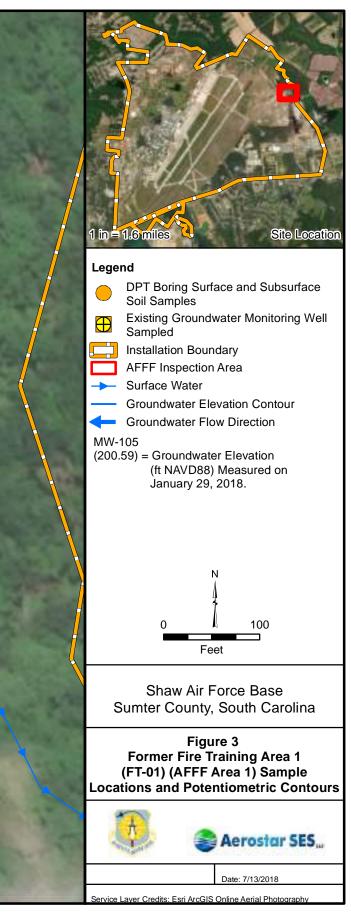




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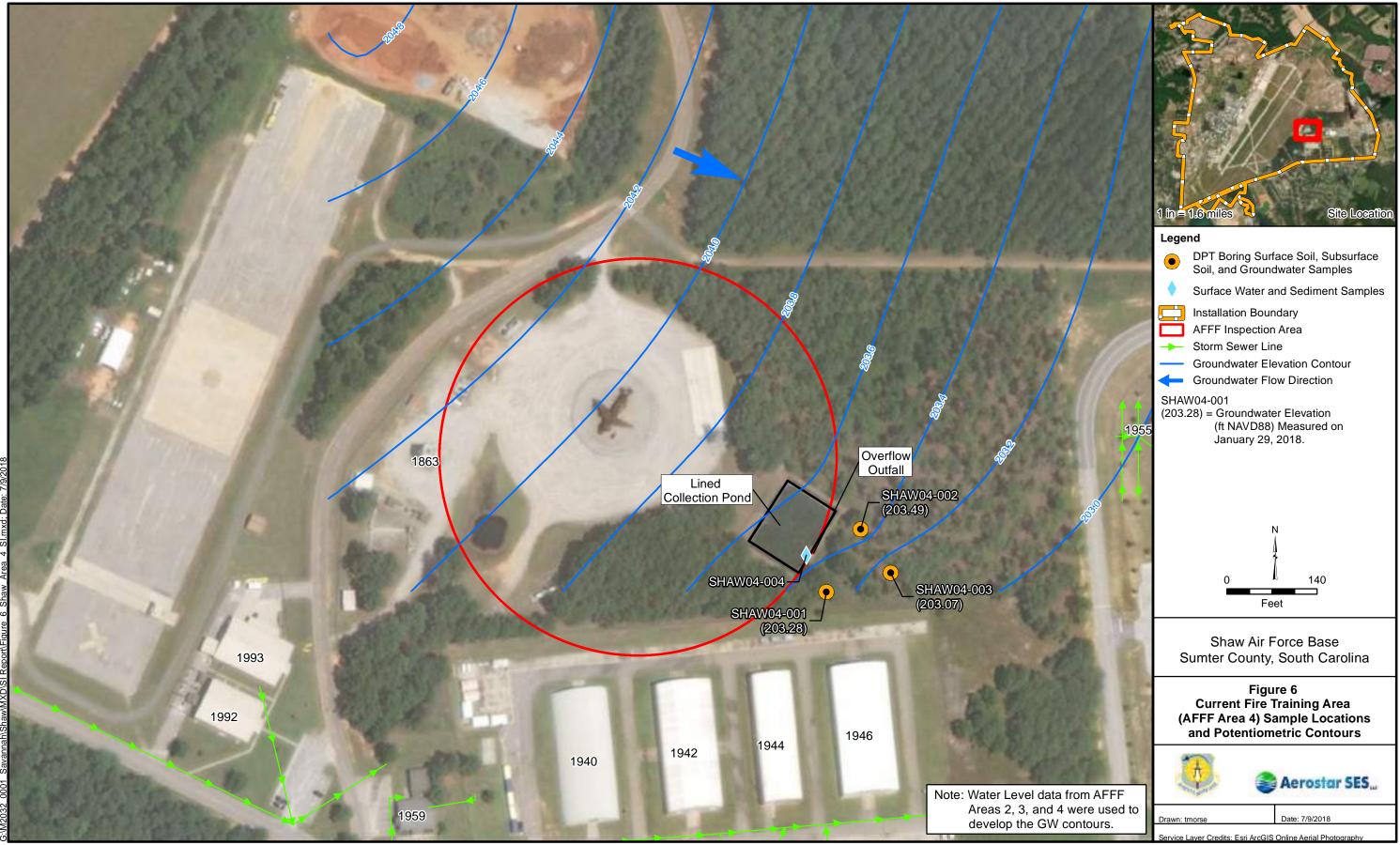


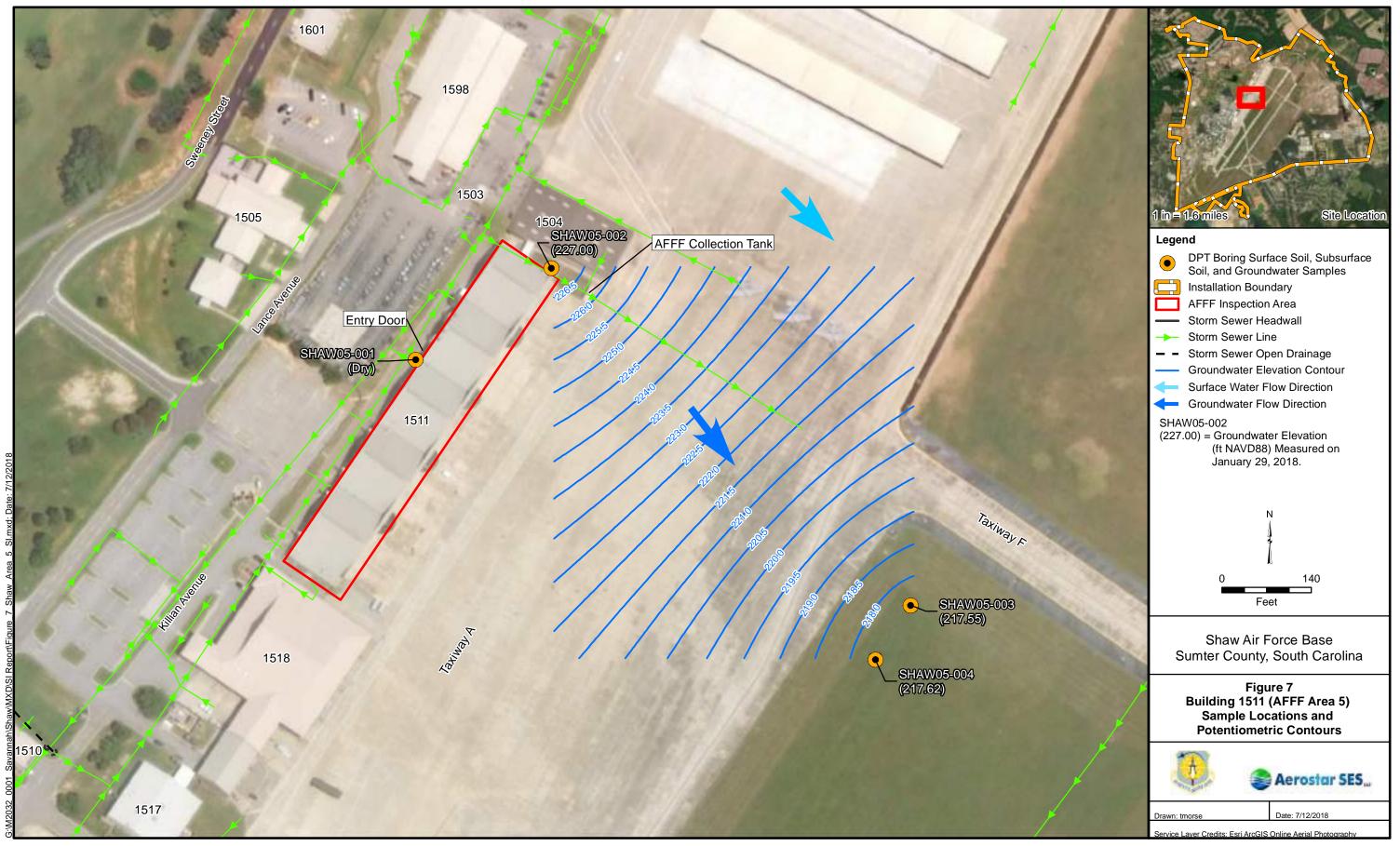
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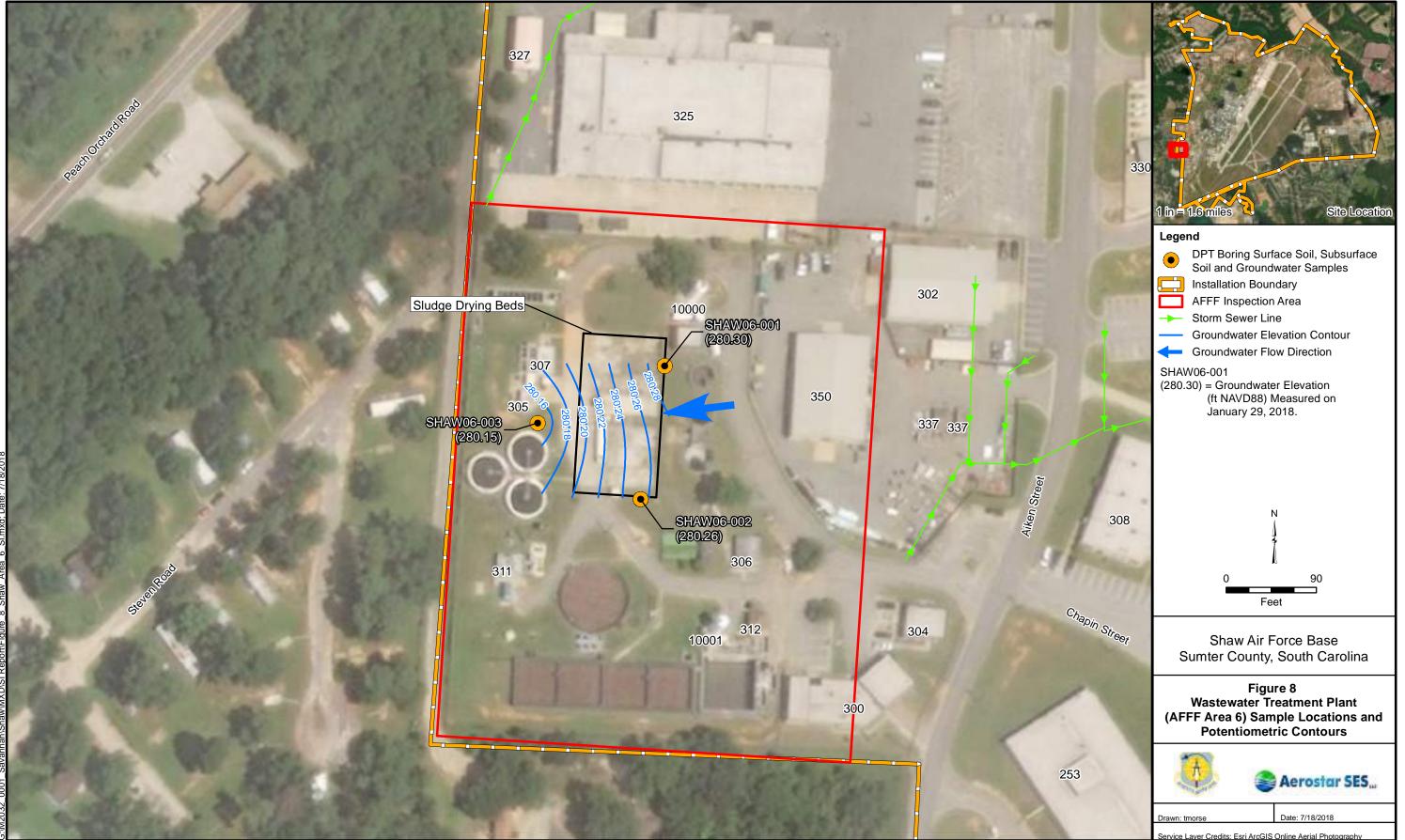




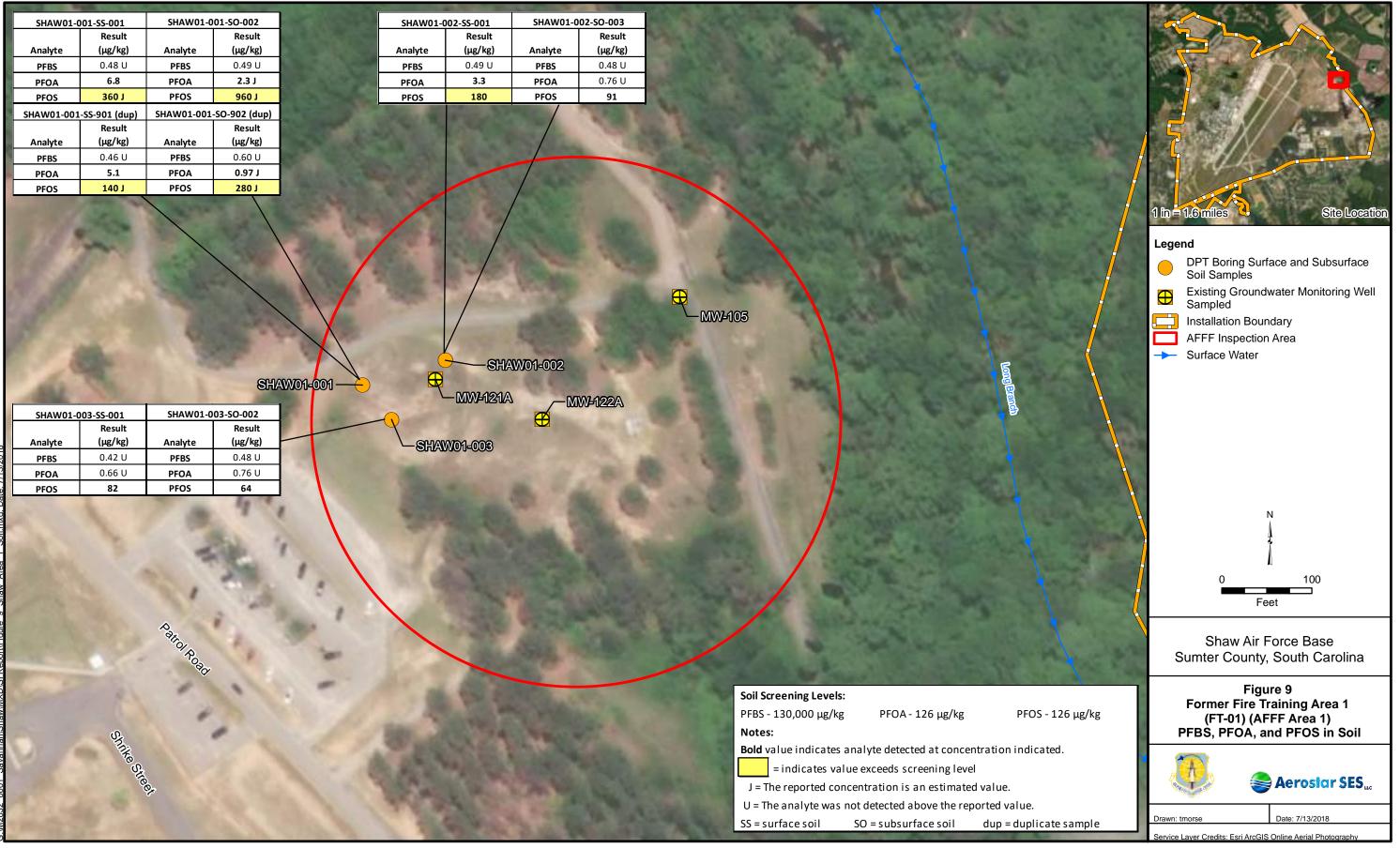


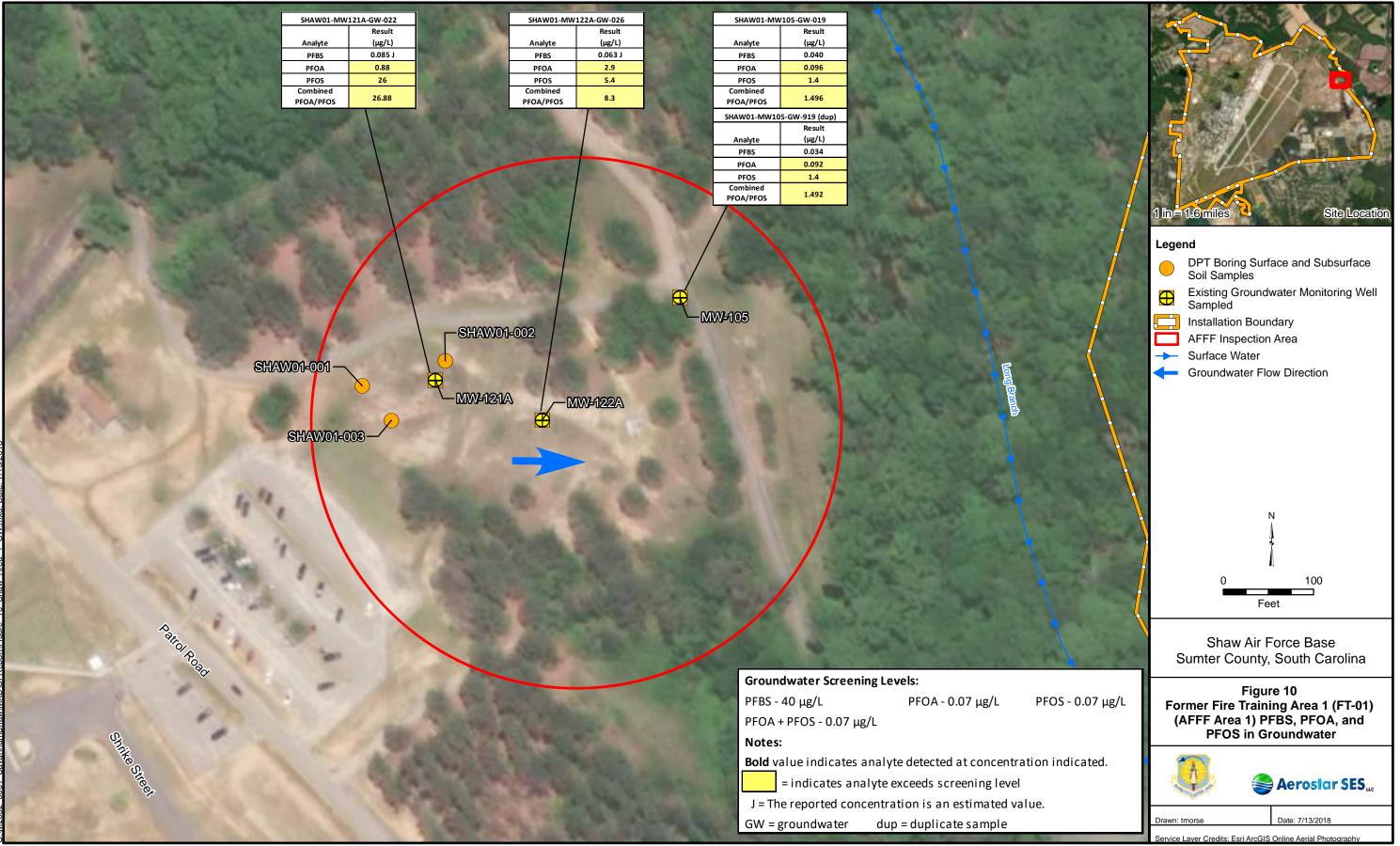


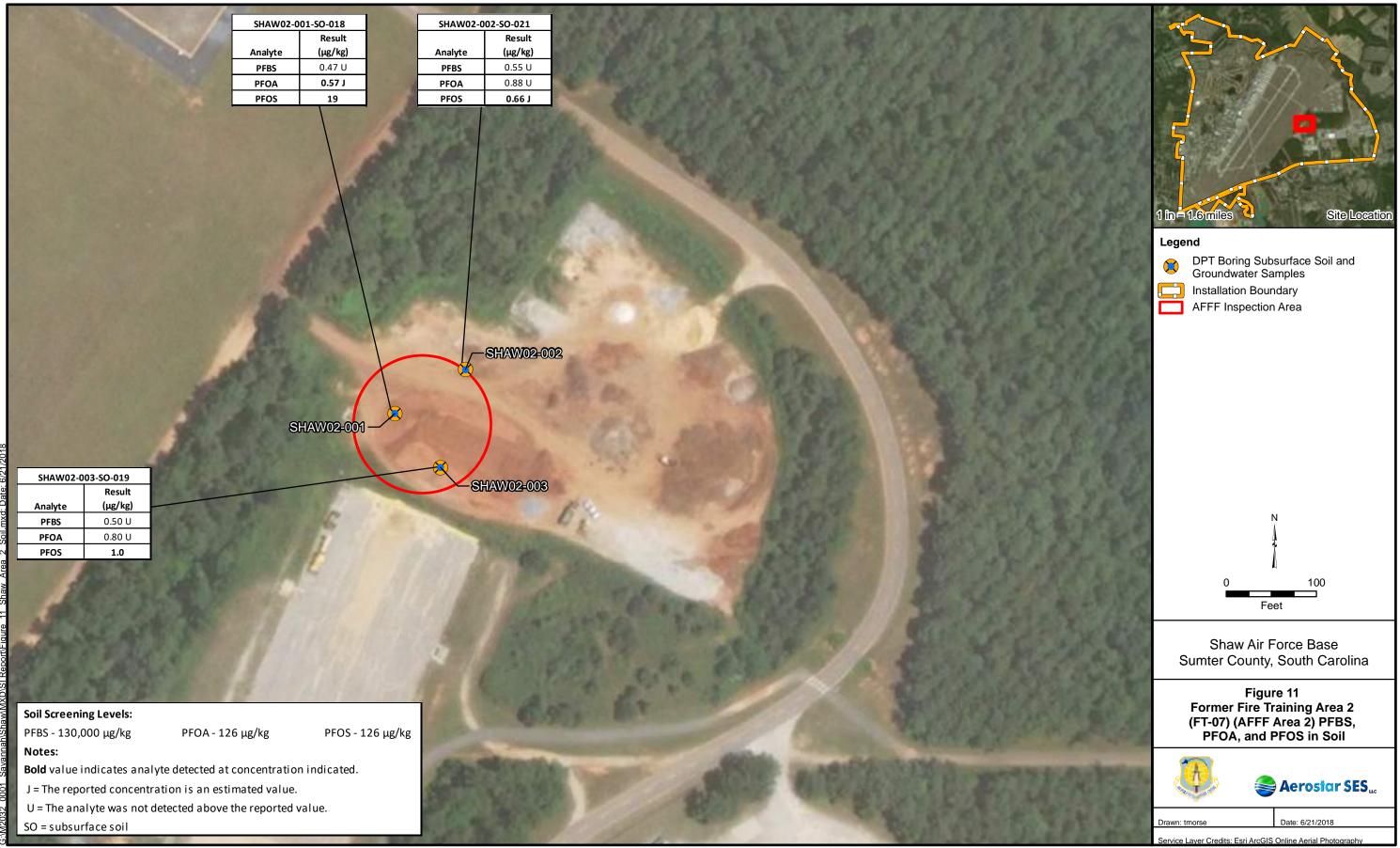


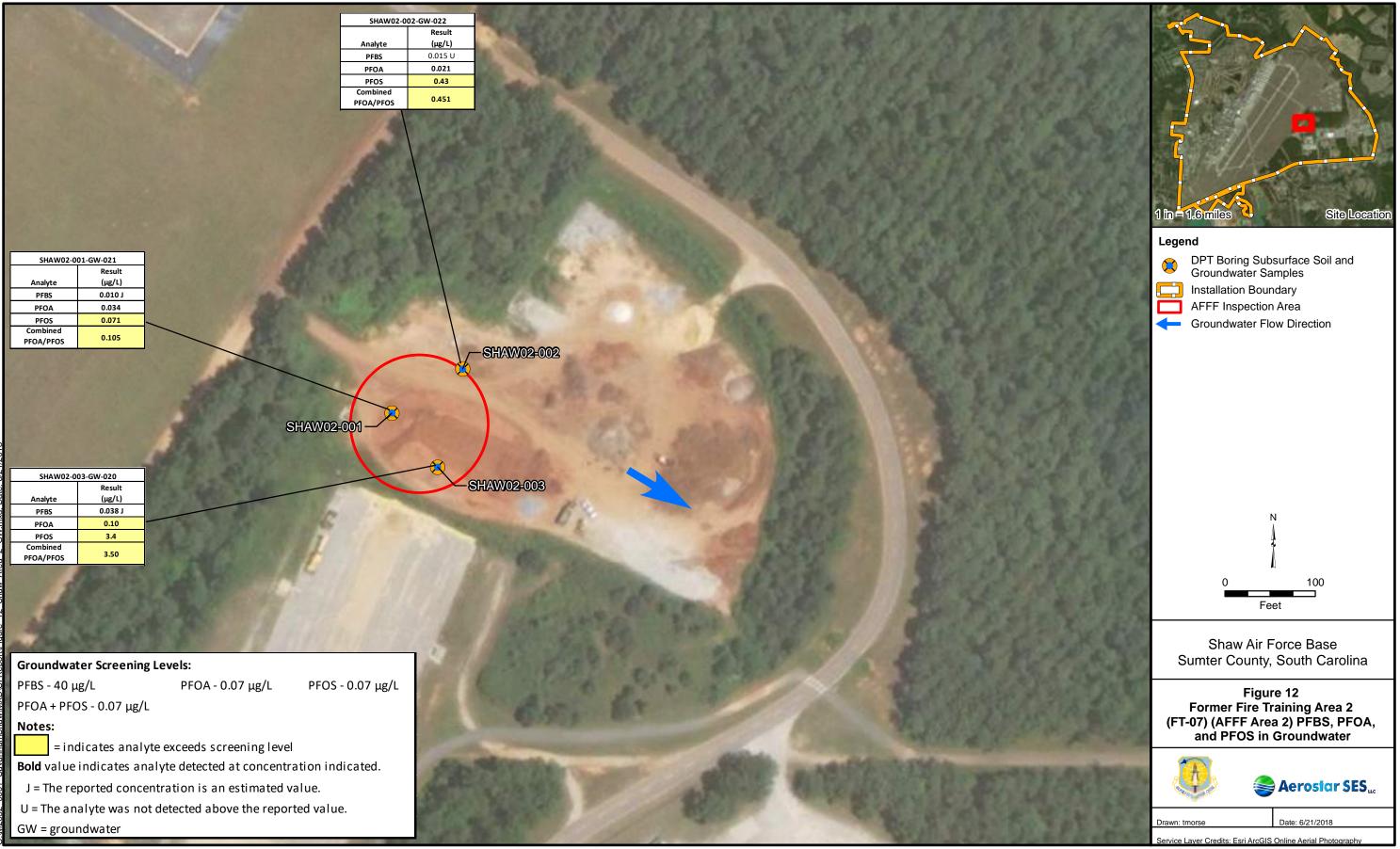


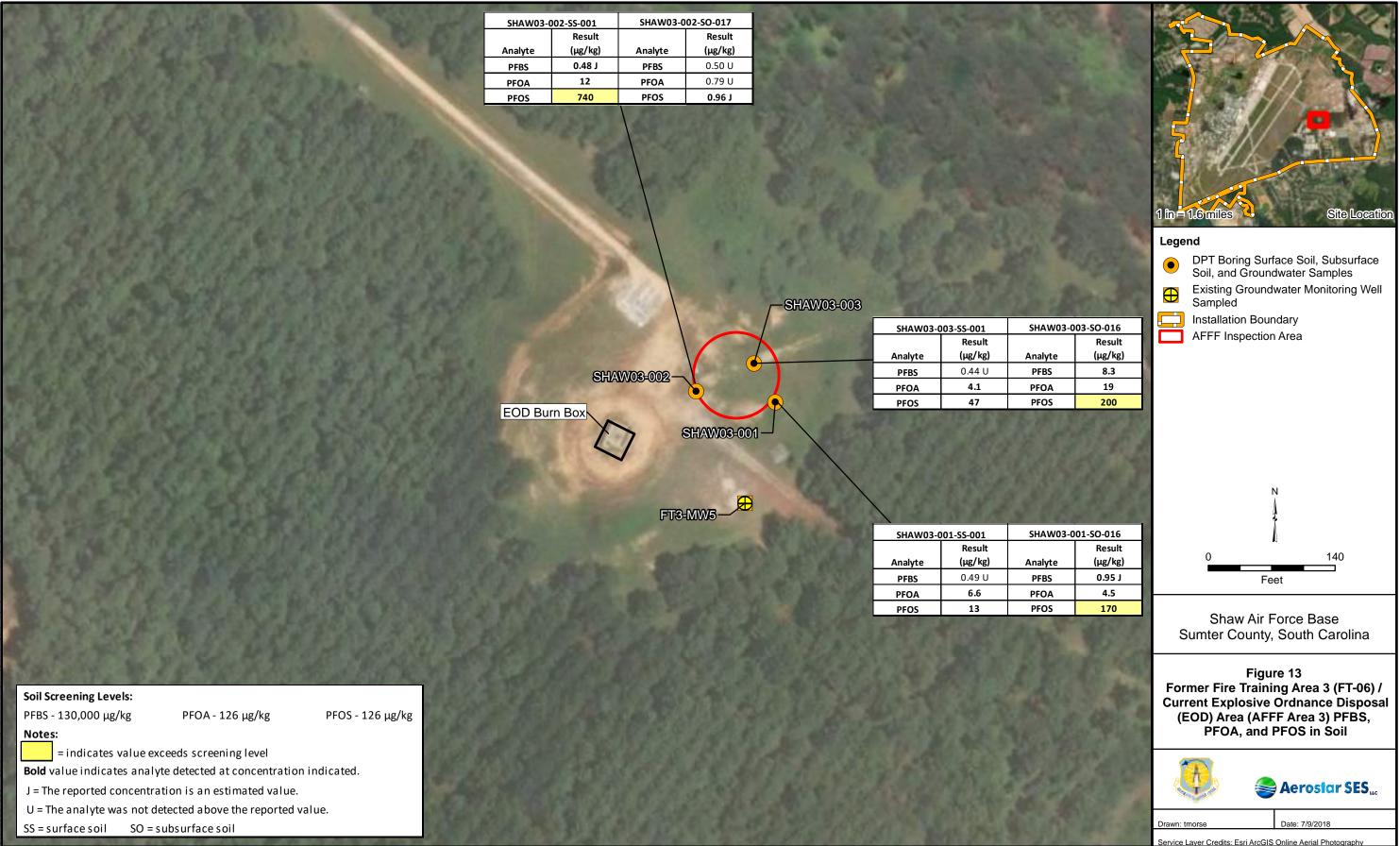
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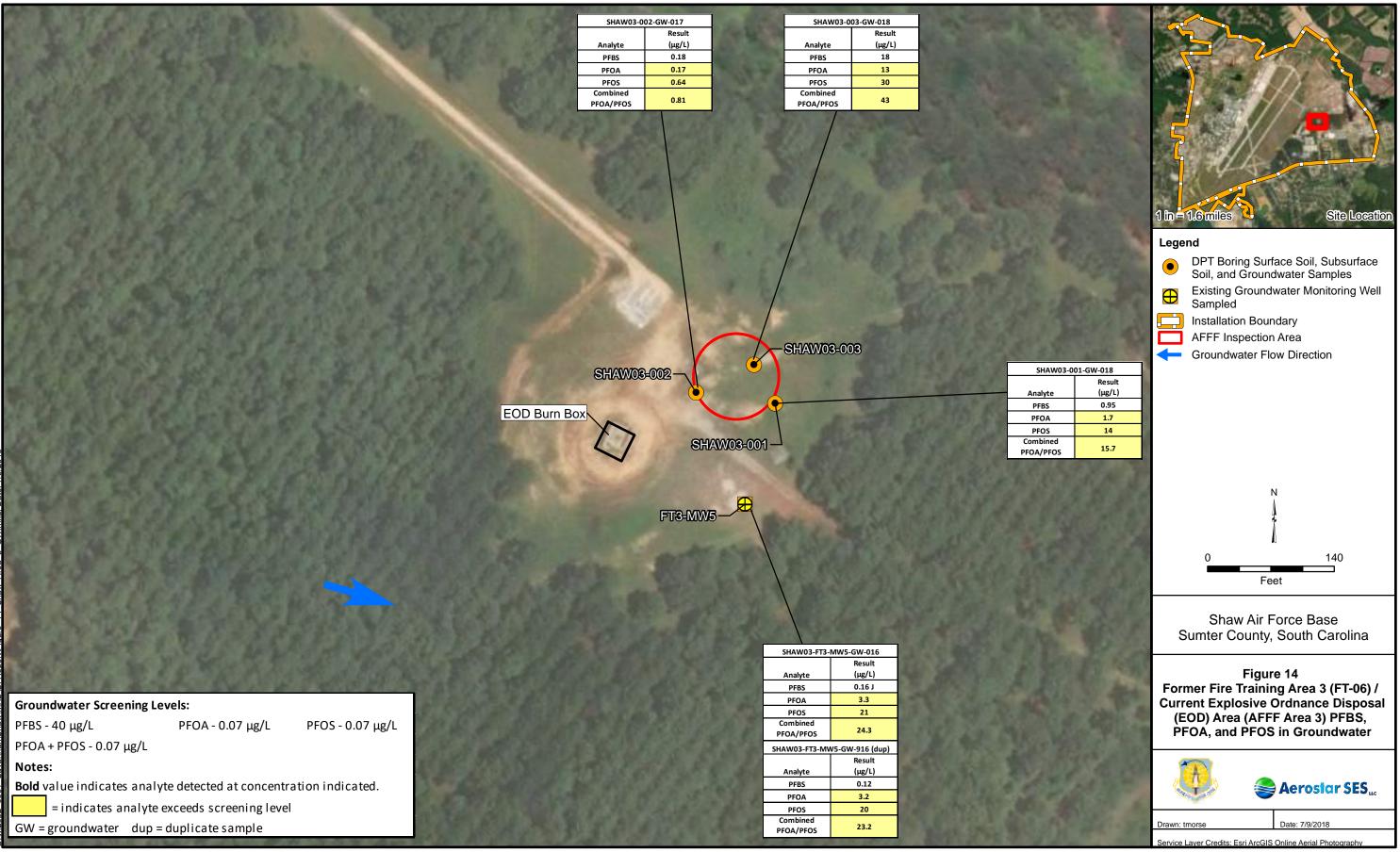




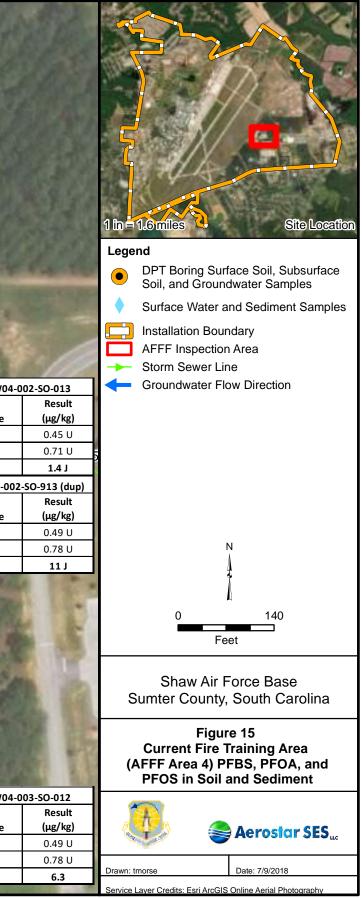


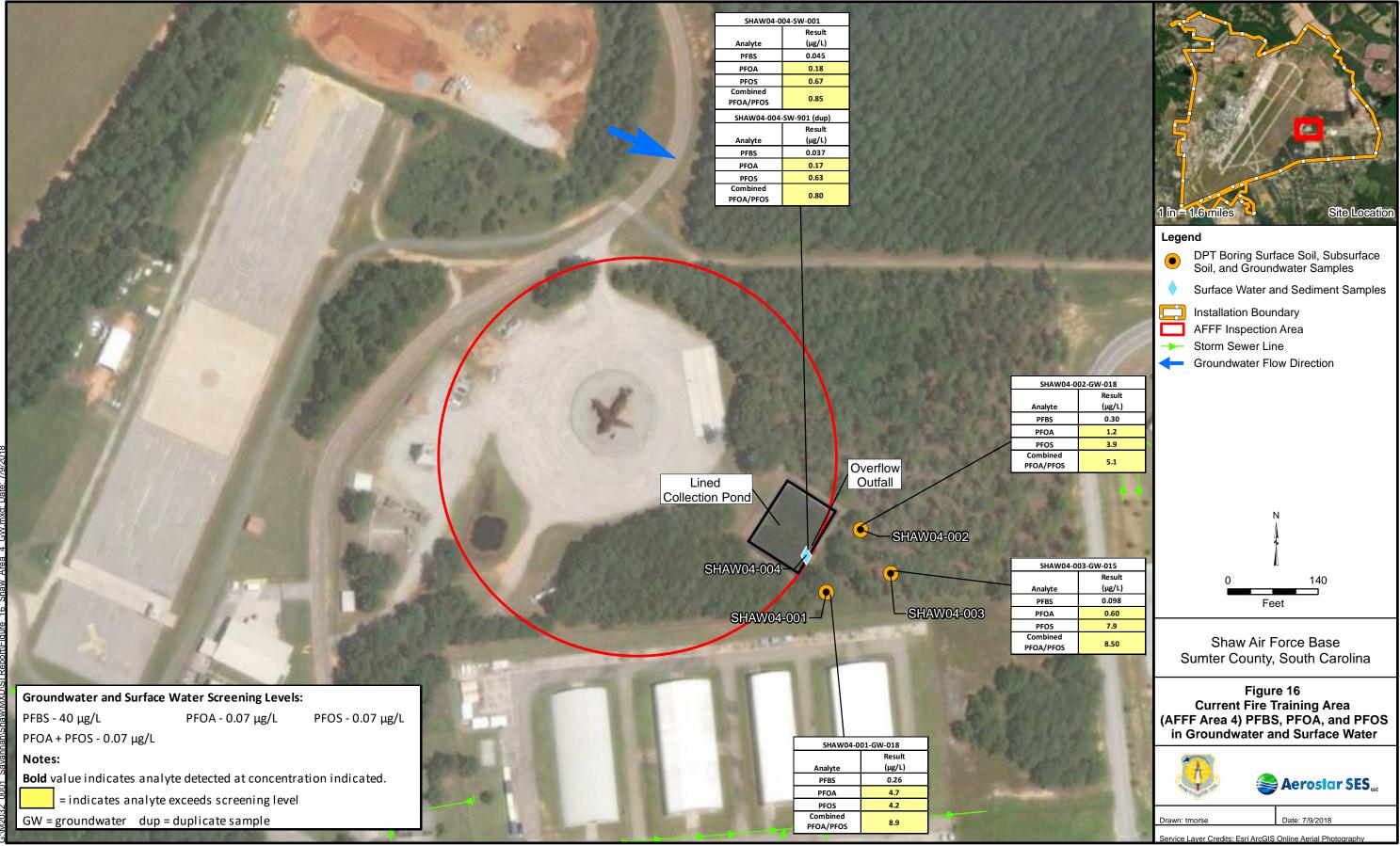


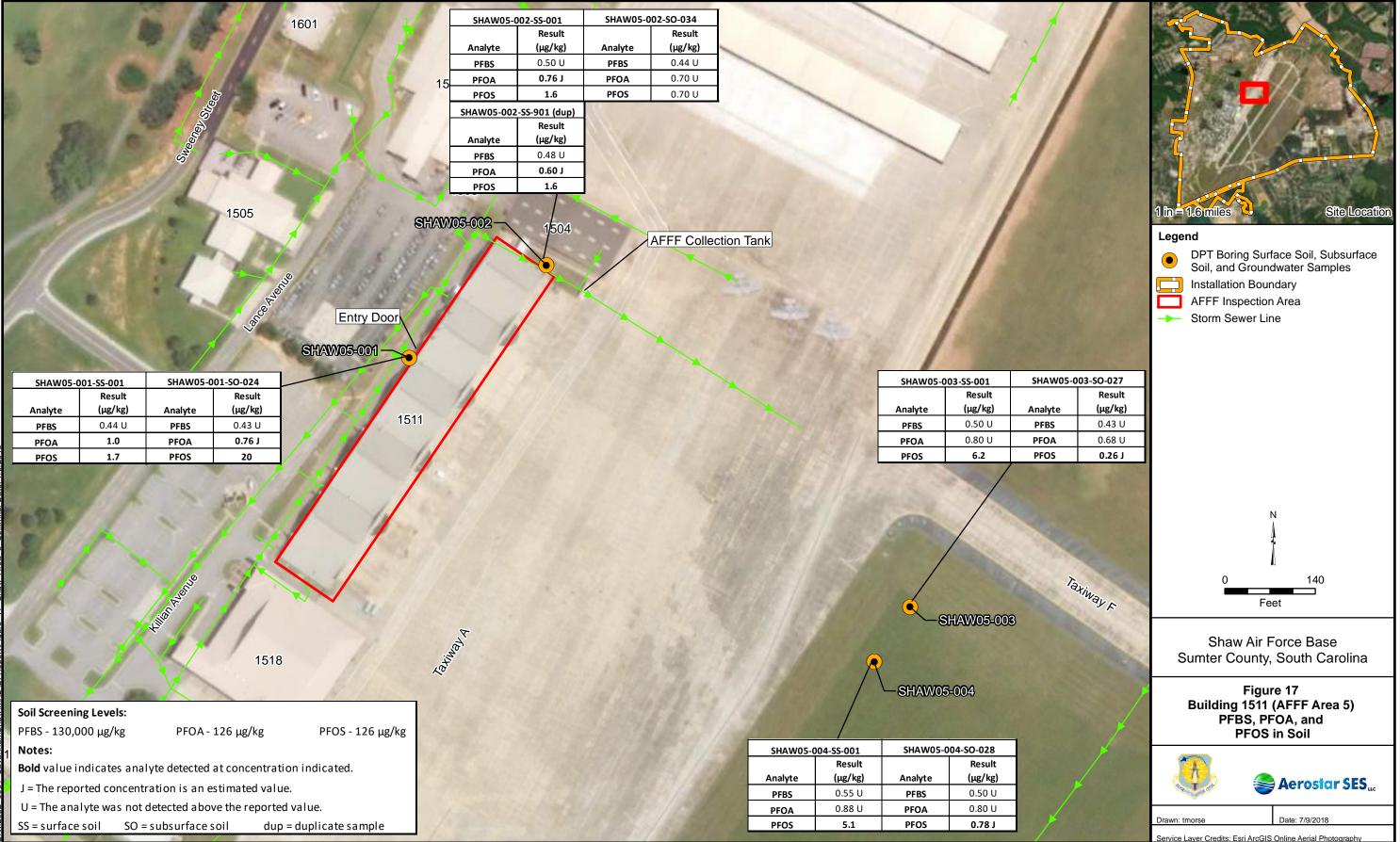


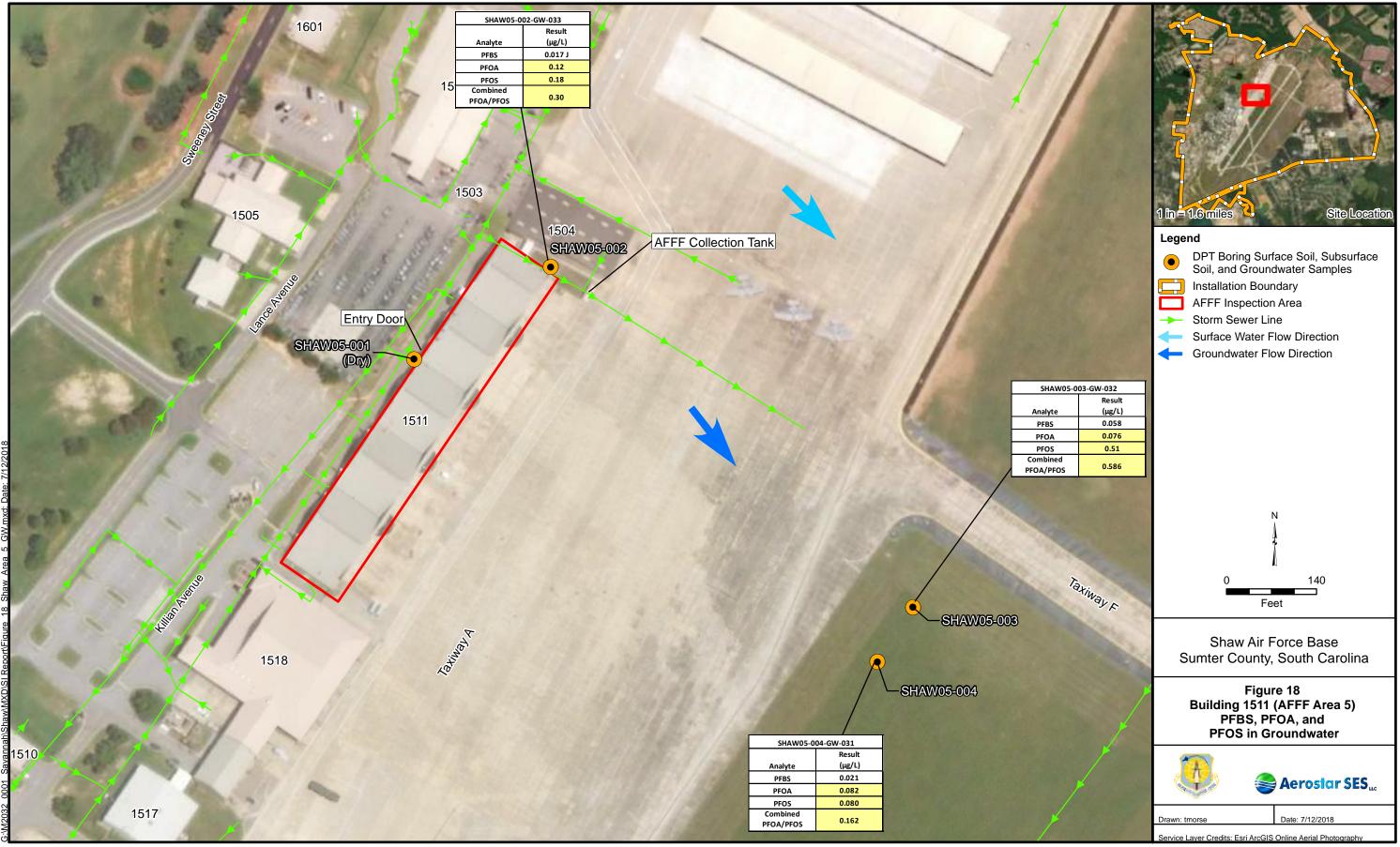


						and a second sec	Analyte PFBS PFOA PFOS	004-SD-001 Result (μg/kg) 0.50 U 0.40 J 26 J I-SD-901 (dup) Result (μg/kg) 0.70 U 1.1 J 67 J				
4 Soilmxd: Date: 7/9/2018			863		W.	Line			rerflow	SHAW04-C Analyte PFBS PFOA PFOS	002-SS-001 Result (µg/kg) 0.50 U 0.80 U 6.2	SHAW04 Analyte PFBS PFOA PFOS SHAW04-00 Analyte PFBS PFOA
Soil and Sediment Screening Levels	<u>1993</u> :: А - 126 µg/kg	PFOS - 126 μg/kg			1	5	SHAW04-004			-SHAW04-	-002 W04-003	PFOS
Notes: Bold value indicates analyte detection J = The reported concentration is a U = The analyte was not detected a SD = sediment SO	ted at concentration In estimated value. Ibove the reported va = subsurface soil	indicated. Ilue.	and a	1	SHAW04-C Analyte PFBS PFOA	Result (μg/kg) 0.44 U 0.90	Analyte PFBS PFOA	001-SO-013 Result (μg/kg) 0.44 U 0.78 J	1946	Analyte PFBS PFOA	003-SS-001 Result (μg/kg) 0.46 U 0.73 U	SHAW04 Analyte PFBS PFOA
SS = surface soil dup	= duplicate sample		. 8. 18	C. Contract	PFOS	27	PFOS	3.4		PFOS	11	PFOS



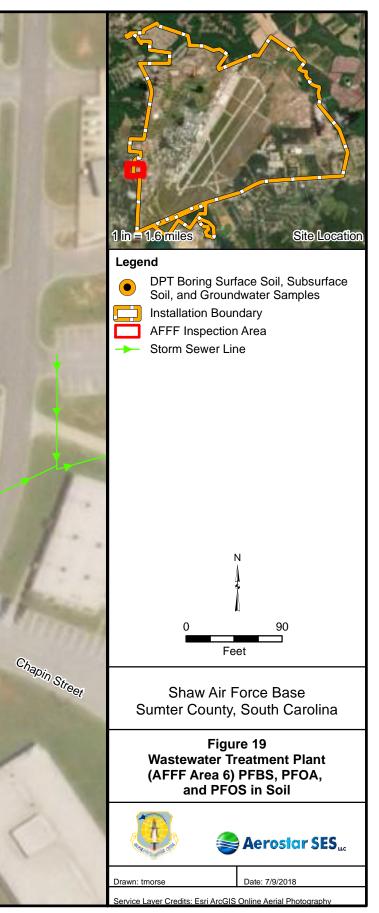






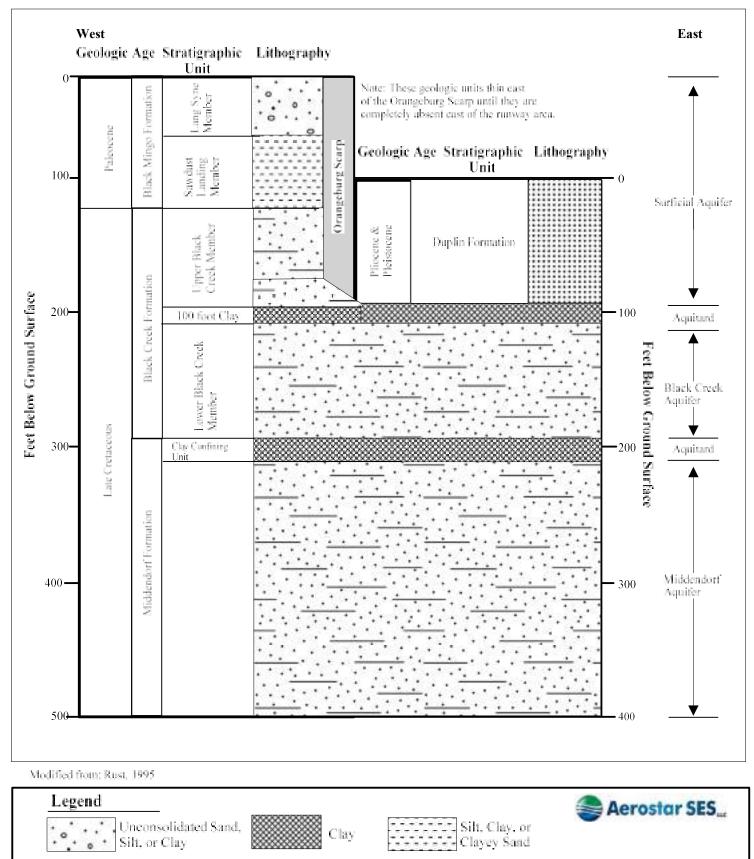


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					100			A Real	State	1000	1	T.B.
					15		No.		Col H	1 1		100
				ALL ST	1 A 100	and the second s	20		1		1	-
				10000	Sludge D	rying Beds		and the second				
de to a		12/1	Take 1	and the Tax	100 C			-	10 -	-	from the second	
SHAW06-	003-SS-001	SHAW06-00			100	100 m	and a start	-SHAW06-	തി		61	P
Analyte	Result (µg/kg)	Analyte	Result (µg/kg)			11	<b>V</b>	CILANCOA			and fame	
PFBS	0.55 U	PFBS	0.60 U			1.4	1000	1.4.	0			
PFOA	1.4	PFOA	0.96 U	1	and the	1. and 19		Get			and a	1
PFOS	33	PFOS	0.96 U		SHAW06-003-	<b>&gt;</b>	Contract of the	1			Martin .	
		16. Y			SHAWU0-003-		10.00	12	11	100	area -	
		1000					1.00			-	and the	
						0			1 10		And the fair	Aiken Street
		1			and the set	$\bigcirc$	R a			and and	14417	u St
					King P	WALL IN	9-1	HAW06-002		George		Aike
			Mr. Ru					-IST		1 m	- 20	
		Read	A			Call Second		10 33				
		Ros		1 2000	64.		3					
100	Stevi	1000					100	State I. A	2 4	100	and the second diversity of th	
3.3		1000			1		4012	1.85.34			31 12	
	2000	Sec.				1 B.	100	Cont	DI I	100	and a second	
						1 2 1	and a state of the	and the second	Et. Sale	1		
		Philip Phil			1		Te	1 town	1.11	-		
Soil Screeni	ng Levels:					the state of the			8.5 F			
PFBS - 130,		PFOA -	126 µg/kg	PFOS - 126 μg/k	g			-		and a		/
Notes:						SHAW06-0	02-SS-001	SHAW06-00	02-SO-026	* 5		5
	indicates ana	lyte detected	at concentratio	n indicated.		1.4.1	Result		Result			
J = The repo	orted concent	ration is an e	stimated value.		ALL	Analyte	<b>(μg/kg)</b> 0.50 U	Analyte	<b>(µg/kg)</b> 0.55 U			
	alvte was not	detected abov	ve the reported	value.	A ANTIN	PFBS PFOA	0.50 0 1.5	PFBS PFOA	0.55 U 0.88 U			
U = The ana	,		-									





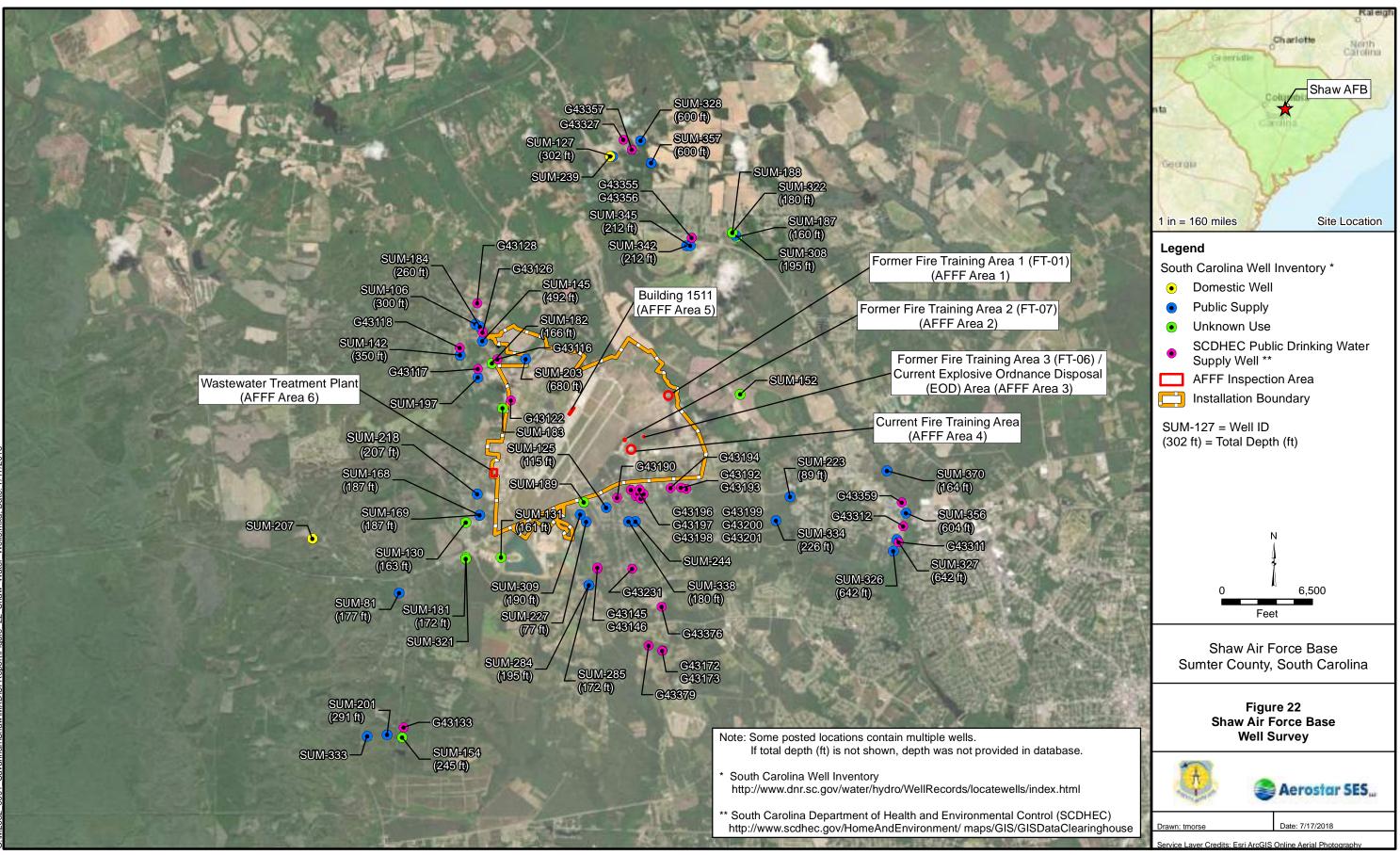
2032 0001 Savannah\Shaw\MXD\SI Report\Figure 20 Shaw Area 6 GW.mxd: Date: 7/9



Coarse sand, with interbedded clays and tine sands

#### Figure 21 Generalized Hydrogeologic Column of Shaw Air Force Base

Silty, Clayey Sand



#### Appendix B

**Regional Screening Level Calculations** 

for

**PFOA and PFOS in Soil and Sediment** 

## Default Resident Equation Inputs for Soil

Variable	Value
THQ (target hazard quotient) unitless	0.1
TR (target risk) unitless	1E-06
LT (lifetime) years	70
ET <sub>rae</sub> (exposure time) hours/day	24
ET <sub>ree</sub> (child exposure time) hours/day	24
ET <sub>ree.a</sub> (adult exposure time) hours/day	24
$ET_{n,2}$ (mutagenic exposure time) hours/day	24
$ET_{2.6}$ (mutagenic exposure time) hours/day	24
ET <sub>6.16</sub> (mutagenic exposure time) hours/day	24
ET <sub>1626</sub> (mutagenic exposure time) hours/day	24
ED <sub>rec</sub> (exposure duration) years	26
ED <sub>mer</sub> (exposure duration - child) years	6
ED <sub>mena</sub> (exposure duration - adult) years	20
$ED_{\alpha_2}$ (mutagenic exposure duration) years	2
$ED_{2.6}$ (mutagenic exposure duration) years	4
$ED_{6.16}$ (mutagenic exposure duration) years	10
ED <sub>16.26</sub> (mutagenic exposure duration) years	10
BW <sub>rec.</sub> (body weight - child) kg	15
BW <sub>rec-a</sub> (body weight - adult) kg	80
BW <sub>0.2</sub> (mutagenic body weight) kg	15
BW <sub>2.6</sub> (mutagenic body weight) kg	15
BW <sub>6.16</sub> (mutagenic body weight) kg	80
BW <sub>16-26</sub> (mutagenic body weight) kg	80
$SA_{res-c}$ (skin surface area - child) cm <sup>2</sup> /day	2373
SA <sub>res-a</sub> (skin surface area - adult) cm <sup>2</sup> /day	6032
SA <sub>0-2</sub> (mutagenic skin surface area) cm <sup>2</sup> /day	2373
SA <sub>2-6</sub> (mutagenic skin surface area) cm <sup>2</sup> /day	2373
SA <sub>6-16</sub> (mutagenic skin surface area) cm <sup>2</sup> /day	6032
SA <sub>16-26</sub> (mutagenic skin surface area) cm <sup>2</sup> /day	6032
EF (exposure frequency) days/year	350
EF (exposure frequency - child) days/year	350
EF <sub>res-a</sub> (exposure frequency - adult) days/year	350

## Default Resident Equation Inputs for Soil

Variable	Value
$EF_{\mathfrak{a},\mathfrak{c}}$ (mutagenic exposure frequency) days/year	350
$EF_{_{2.6}}$ (mutagenic exposure frequency) days/year	350
EF <sub>6.16</sub> (mutagenic exposure frequency) days/year	350
EF <sub>16.26</sub> (mutagenic exposure frequency) days/year	350
IFS <sub>recarli</sub> (age-adjusted soil ingestion factor) mg/kg	36750
IFSM <sub>recarti</sub> (mutagenic age-adjusted soil ingestion factor) mg/kg	166833.3
IRS <sub>rec</sub> (soil intake rate - child) mg/day	200
IRS <sub>rec-a</sub> (soil intake rate - adult) mg/day	100
IRS <sub>0.2</sub> (mutagenic soil intake rate) mg/day	200
IRS <sub>2.6</sub> (mutagenic soil intake rate) mg/day	200
$IRS_{6.16}$ (mutagenic soil intake rate) mg/day	100
IRS <sub>16.26</sub> (mutagenic soil intake rate) mg/day	100
AF <sub>res-a</sub> (skin adherence factor - adult) mg/cm <sup>2</sup>	0.07
AF <sub>res-c</sub> (skin adherence factor - child) mg/cm <sup>2</sup>	0.2
AF <sub>0-2</sub> (mutagenic skin adherence factor) mg/cm <sup>2</sup>	0.2
$AF_{2.6}$ (mutagenic skin adherence factor) mg/cm $^{2}$	0.2
$AF_{6-16}$ (mutagenic skin adherence factor) mg/cm $^{2}$	0.07
$AF_{16-26}$ (mutagenic skin adherence factor) mg/cm $^{2}$	0.07
DFS <sub>recard</sub> (age-adjusted soil dermal factor) mg/kg	103390
DFSM <sub>recardi</sub> (mutagenic age-adjusted soil dermal factor) mg/kg	428260
AT <sub>ree</sub> (averaging time - resident carcinogenic)	365
City <sub>per</sub> (Climate Zone) Selection	Default
A <sub>e</sub> (PEF acres)	0.5
Q/C <sub>wind</sub> (g/m <sup>2</sup> -s per kg/m <sup>3</sup> )	93.77
PEF (particulate emission factor) m <sup>3</sup> /kg	1359344438
A (PEF Dispersion Constant)	16.2302
B (PEF Dispersion Constant)	18.7762
C (PEF Dispersion Constant)	216.108
V (fraction of vegetative cover) unitless	0.5
$U_{m}$ (mean annual wind speed) m/s	4.69
U, (equivalent threshold value)	11.32
$F(x)$ (function dependent on U $_m/U_t$ ) unitless	0.194

## Default Resident Equation Inputs for Soil

City $_{ve}$ (Climate Zone) SelectionDefault $A_e$ (VF acres)0.5 $Q/C_{vol}$ (g/m²-s per kg/m³)68.18foc (fraction organic carbon in soil) g/g0.006 $p_b$ (dry soil bulk density) g/cm ³1.5 $p_s$ (soil particle density) g/cm ³2.65n (total soil porosity) L/L_edl0.43396
$Q/C_{vol}$ (g/m²-s per kg/m³)68.18foc (fraction organic carbon in soil) g/g0.006 $p_b$ (dry soil bulk density) g/cm ³1.5 $p_s$ (soil particle density) g/cm ³2.65
foc (fraction organic carbon in soil) g/g $0.006$ $p_b$ (dry soil bulk density) g/cm $^3$ $1.5$ $p_s$ (soil particle density) g/cm $^3$ $2.65$
$p_b$ (dry soil bulk density) g/cm $^3$ 1.5 $p_s$ (soil particle density) g/cm $^3$ 2.65
p <sub>s</sub> (soil particle density) g/cm <sup>3</sup> 2.65
5
n (total soil porosity) L/L 0.43396
Theta (air-filled soil porosity) L //L 0.28396
Theta, (water-filled soil porosity) L water /L soil 0.15
T (exposure interval) s 819936000
A (VF Dispersion Constant) 11.911
B (VF Dispersion Constant) 18.4385
C (VF Dispersion Constant) 209.7845
City <sub>VE maceInarting</sub> (Climate Zone) Selection Default
$VF_{ml}$ (volitization factor - mass-limit) m $^{3}/kg$ .
$Q/C_{vol}$ (g/m <sup>2</sup> -s per kg/m <sup>3</sup> ) 68.18
A <sub>c</sub> (VF mass-limit acres) 0.5
T (exposure interval) yr 26
d (depth of source) m .
p <sub>b</sub> (dry soil bulk density) g/cm <sup>3</sup> 1.5
A (VF Dispersion Constant - Mass Limit) 11.911
B (VF Dispersion Constant - Mass Limit) 18.4385
C (VF Dispersion Constant - Mass Limit) 209.7845
T <sub>w</sub> (groundwater temperature) Celsius 25

#### Default Resident Risk-Based Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice); c = cancer; n = noncancer; \* = where: n SL < 100X c SL; \*\* = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); U = User-provided

Che	emical	CAS Number	r Mutagen?	-	jestion SF kg-day) <sup>-1</sup>	SFO	Inhalation Unit Risk (ug/m³) <sup>.1</sup>	IUR Ref	RfD (mg/kg-day	Rf y) Re	D RfC ef (mg/m	RfC 3) Ref	GIAB	5 ABS	6 RBA	Soi Saturat Concentr (mg/k	ion ation	S mg/L)
Perfluorooc sulfonic aci		1763-23-	1 No	No	-		-		2.00E-05	C	) –		1	0.1	1	-	6.8	30E+02
Perfluorooc (PFOA)	tanoic acid	335-67-1	No	No 7.0	00E-02	D	-		2.00E-05	C	) –		1	0.1	1	-	9.5	50E+03
K (cm3/g) 3.72E+02 1.15E+02	k (cm <sup>3</sup>	š/g)	HLC (atm-m ³/mole - -	Henry's Law Constant ) (unitless) -	H`Bo and Po HLC T Ref (		BP Ref PHYSPROI PHYSPROI	P	Critical emperature T <sub>crit</sub> (K) -		D <sub>ia</sub> (cm²/s) 2.07E-02 2.26E-02		/ <b>s) (c</b> -06	D_ m²/s) -	Partice Emiss Fact (m <sup>3</sup> /l 1.36E	sion Vola tor F kg) ( +09	atilization Factor m³/kg) -	
Ingestion SL TR=1E-06 (mg/kg)	SL	SL	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL Child THQ=0.1 (mg/kg)	Dermal SL Child THQ=0.1 (mg/kg)	S Ch THQ	lation Nor 6L hild 2=0.1 //kg)	C TH		ngest SL Adu THQ= (mg/ł	ilt Ad 0.1 THC	rmal 5L dult 2=0.1 g/kg)	Inhalat SL Adu THQ= (mg/k	lt 0.1	A TH	cinogenic SL dult I=0.1 g/kg)	Screeni Level (mg/kg	
- 9.93E+00	- 3.53E+01	-	- 7.75E+00	1.56E-01 1.56E-01	6.59E-01 6.59E-01		-				+00 3.95 +00 3.95		-			′E+00 ′E+00	1.26E-0 <sup>-</sup> nc 1.26E-0 <sup>-</sup>	

nc

Inhalation Unit Risk To	xicity Metad	ata								5
Chemical	CASNUM	Inhalation Unit Risk (µg/m <sup>3</sup> ) <sup>-1</sup>	EPA Cancer Classification	Unit Risk Tumor	Inhalation Unit Risk Target Organ	Inhalation	Unit Risk	Unit Risk Treatment	Inhalation Unit Risk Study Reference	Inhalation Unit Risk Notes
Perfluorooctane sulfonic acid (PFOS)	1763-23-1									
Perfluorooctanoic acid (PFOA)	335-67-1									

Oral Slope Factor Toxicity Metadata												
Chemical	CASNUM	Oral Slope Factor (mg/kg-day) <sup>.1</sup>	-	EPA Cancer Classification	Factor Tumor	Target	Slope Factor		Factor	Treatment	-	Oral Slope Factor Notes
Perfluorooctane sulfonic acid (PFOS)	1763-23-1											
Perfluorooctanoic acid (PFOA)	335-67-1	7.00E-02	DWSHA	NA	NA	NA	NA	NA	NA	NA	NA	NA

#### Oral Chronic Toxicity Metadata

	Chemical		CASNUM	Chronic Oral Reference Dose (mg/kg-day	Toxicity	Oral Chronic Reference Dose Basis	Oral Chronic Reference Dose Confidence Level	Oral Chronic Reference Dose Critical Effect
Perfluoroocta	ane sulfonic	acid (PFOS)	1763-23-1	2.00E-05	DWSHA	NA	NA	NA
Perfluoroocta	anoic acid (F	PFOA)	335-67-1	2.00E-05	DWSHA	NA	NA	NA
					_			
Oral Chronic Reference Dose Target Organ	Dose	Oral Chronic Reference Dose Uncertainty Factor	Oral Chronic Reference Dose Species		Oral Chronic Reference Dose Study Duration	Oral Chronic Reference Dose Study Reference	Oral Chronic Reference Dose Notes	
NA	NA	NA	NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	NA	NA	NA	

СІ	hemical		CASNUM	Chronic Inhalation Reference Concentration (mg/m <sup>3</sup> )	Toxicity Source	Ch Ref Conce	alation pronic erence entration Basis	Cl Ref Conc Conc	alation nronic erence entration fidence .evel	Ch Ref Conce	alation pronic erence entration cal Effect	Inhalation Chronic Reference Concentration Target Organ
Perfluorooctane Perfluorooctanoi	sulfonic acid (PF c acid (PFOA)	OS)	1763-23-1 335-67-1	-								
Inhalation Chronic Reference Concentration Modifying Factor	Inhalation Chronic Reference Concentration Uncertainty Factor	C Re Con	halation Chronic eference centration Species	Inhalation Chronic Reference Concentration Route	Inhalat Chror Referer Concentr Stud Durati	nic nce ration	Inhalat Chror Referer Concentr Stud Referer	nic nce ration	Inhalat Chror Refere Concenti Note	nic nce ration		

# Appendix C Boring Logs and Field Forms

AF	FF /	Are AFF Proje	erostar SE eas (Savannah District F Site Inspection ect# M2032.0001 w Air Force Base		BORING LOG - SHAW01-001 (Page 1 of 1)       Site Name Drilling Company Drilling Method Driller         Start Date       : 01/26/18         End Date       : 01/26/18         Northing       : 782031.14         Easting       : 2166359.17         Surface Elev. (ft)*       : 215.37         Total Depth (ft)**       : 5.0							ter on ate	: Area 1 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/26/18 : No water encountered : Jeremy Klein	
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	Water Levels During Drilling DESCR	*Nor Datu **Be (bgs	asurements th American Vertical m (NAVD88) feet (ft) low Ground Surface ) feet (ft)	PID (ppm)	NSCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	s	SAMPLE ID		REMARKS
0-		100	(0.0 - 3.5) SILTY SAND, 1 yellow, non-plastic, sub-ro grained, slight odor (3.5 - 5.0) SANDY CLAY, dark gray, medium stiff, sa	high p	d, soft, fine		SM			so	SHAN	W01-001-SS-001 lote: Interval 0.0 - 0.5 ft W01-001-S0-002 lote: Interval 2.0 - 3.0 ft		
5-			grained, poorly graded, fur End of Borehole 5.0 ft bgs		r, wet	28	СН							

AF	FF	Are AFF Proj	erostar SE eas (Savannah District F Site Inspection ect# M2032.0001 w Air Force Base		Start Date         : 01/26/18           End Date         : 01/26/18           Northing         : 782058.53           Easting         : 2166451.24           Surface Elev. (ft)*         : 214.97           Total Depth (ft)**         : 5.0							Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dril Logged By	ter on ate	: Area 1 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/26/18 : 4.5 : Jeremy Klein
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	Water Levels During Drilling DESCR	*Nort Datu **Bel (bgs)	Isurements th American Vertical m (NAVD88) feet (ft) low Ground Surface ) feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		REMARKS
0-			(0.0 - 5.0) SILTY SAND, 1 yellow, sub-rounded, soft, grained, sub-rounded, dan	slight	fuel odor, fine					SS		W01-002-SS-001 lote: Interval 0.0 - 0.5 ft		
-	1	100					SM			so		W01-002-S0-003 Jote: Interval 3.0 - 4.0 ft		
5-			End of Borehole 5.0 ft bgs			16			•					7/12/18

AF	FF /	Are AFF Proj	erostar SE eas (Savannah District F Site Inspection ect# M2032.0001 w Air Force Base		BORING LC Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	: ( : ( : 7 : 2	- S	(Pa /18 /18 92.92 391.4	age	1-0( 1 of		Site Name Drilling Company Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dril Logged By	ter on ate	: Area 1 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/26/18 : 3.5 : Jeremy Klein
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	Water Levels During Drilling DESCR	*Nort Datu **Bel (bgs)	Isurements th American Vertical m (NAVD88) feet (ft) low Ground Surface ) feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		REMARKS
0-			(0.0 - 4.0) SILTY SAND, 1 yellow, sub-rounded, soft, odor, damp to wet	0YR 6 fine g	6/6, brownish rained, fuel					SS		№1-003-SS-001 lote: Interval 0.0 - 0.5 ft		
-	. 1	100					SM			so		W01-003-S0-002 lote: Interval 2.0 - 3.0 ft		
-			(4.0 - 5.0) SANDY CLAY, 6/6, reddish yellow, mediu fine grained, poorly graded	m stiff	f, sub-angular,	-	СН		V					
5-			End of Borehole 5.0 ft bgs	;		18								
			2 0001				2							7/12/18

AF			erostar SE eas (Savannah District F Site Inspection ect# M2032.0001		BORING LC Start Date End Date Northing Easting	: ( : ( : 7	- S	(F 5/18 5/18 794.8	Pag	/02 je 1		Drilling Mo	hod ameter apletion	: CA : DF : Bri : 2.2 : Gr	ea 2 ASCADE PT ian Thomas 25 in. outed to surface /29/18
			w Air Force Base		Surface Elev. (ft)* Total Depth (ft)**		222.8 25.0					DTW Durin Logged By	g Drilling (ft)	: 19 : Je	.4 remy Klein
L.			Water Levels	*Nor	surements th American Vertical m (NAVD88) feet (ft)			Color		(M I C)					
DEPTH IN FEET (bgs)	RVAL	% RECOVERY		**Be	low Ground Surface ) feet (ft)	(mdc		II Soil		Deptn to water (D1 w)	PLE TYPE	SAMPLE ID			y Well: SHAW02-001 C): 223.16
DEPT (b	INTERVAL	% RE	DESCR	IPTI	ON	PID (ppm)	USCS	Munsell	4		SAMPLE			(	
-0-	1	100	(0.0 - 9.5) CLAYEY SAND sub-rounded, medium der odor, damp	), 2.5Y ısity, fi	R 3/6, dark red, ne grained, no	0			///////////////////////////////////////		SS	SHAW02-001-SS-00 Note: Interval 0.0 - 0.5 ft			– Riser 0.75 in. Sch 40 PVC
5	2	68				0	sc								
10-			(9.5 - 12.3) CLAYEY SAN red, sub-rounded, medium no odor, damp	D, 5Yl 1 dens	R 5/8, yellowish ity, fine grained,	0	sc								
- - 15-	3	54	(12.3 - 19.4) SAND, poorly white, sub-rounded, very i odor, dry	y grad oose,	ed, 2.5YR 8/1, fine grained, no	0	SP	<b>•</b>							– Open 2.25 in. diameter borehole
-	4	52								- - 	so	SHAW02-001-S0-01 Note: Interval 18.0 - 19.0 ft			
20-			(19.4 - 25.0) SAND, poorly white, sub-round, very loo odor, wet			0									– Screen (10.0 ft) 14.8 - 24.8 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
-	5	44					SP	•							
25-			End of Borehole 25.0 ft bo	js		0									-End Cap

AF	FF	Are AFF <sup>P</sup> roj	erostar SE eas (Savannah District F Site Inspection ect# M2032.0001 w Air Force Base	ALC: NO ON	BORING LC Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	: ( : ( : 7 : 2	)1/25 )1/25 7788	(P 5/18 5/18 43.56 512.4	age	1 of	Drilling Mothes	ny eter tion Date rilling (ft)	: Area 2 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/29/18 : 22.0 : Jeremy Klein
			Water Levels	Меа	surements				S		Logged By		
EET		27	During Drilling		th American Vertical m (NAVD88) feet (ft)			Soil Color	Depth to Water (DTW)	TYPE			
DEPTH IN FEET (bgs)	INTERVAL	RECOVERY			low Ground Surface ) feet (ft)	PID (ppm)	S		h to Wa	PLE TY	SAMPLE ID		oorary Well: SHAW02-002 (TOC): 222.74
DEP'	INTE	% RE	DESCR	IPTI	NC	DID (	USCS	Munsell	Dept	SAMPLE			
-00	1	100	(0.0 - 9.0) CLAYEY SAND high density, fine grained graded sand, no odor, dar	, sub-r		0				SS	SHAW02-002-SS-001 Note: Interval 0.0 - 0.5 ft		Riser 0.75 in. Sch 40 PVC
5-	2	66				0	SC						
10-	3	54	(9.0 - 13.9) CLAYEY SAN red, medium density, fine poorly graded sand, no oc (13.9 - 22.0) SAND, poorly	graine lor, da	d, sub-rounded, mp	0	sc						— Open 2.25 in. diameter borehole
15-	4	46	white, very loose, sub-rou damp	nded,	fine grained,	0	SP	•					
20-	-		(22.0. 25.0) CAND well a		2 EVD 7/4	0			•	so	SHAW02-002-S0-021 Note: Interval 21.0 - 22.0 ft		Screen (10.0 ft) 14.8 - 24.8 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
- 25-	5	42	(22.0 - 25.0) SAND, well g light reddish gray, mediun loose, mild fuel odor, wet	n grain	, 2.5YR //1, ed, sub-angular,	18	sw	/					End Cap
23-	-		End of Borehole 25.0 ft bo	js									ovp

AF	FF F	Are AFF Proje	erostar SES eas (Savannah District) F Site Inspection ect# M2032.0001 w Air Force Base	-	BORING LC Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	: C : C : 7 : 2 : 2	- S	(P) /18 /18 35.26	age	2-00		Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dril Logged By	y : ter : on : ate : ling (ft) :	Area 2 CASCADE DPT Brian Thomas 2.25 in. Grouted to surface 01/29/18 20.0 Jeremy Klein
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	Water Levels During Drilling DESCRI	*Nort Datur **Bel (bgs)	surements h American Vertical m (NAVD88) feet (ft) ow Ground Surface feet (ft)	PID (ppm)	NSCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	s	AMPLE ID		orary Well: SHAW02-003 FOC): 222.72
0 — - - - -	1	100	(0.0 - 3.0) CLAYEY SAND, well graded, subangular, 5 red, medium density, no oc (3 - 9.8) CLAYEY SAND, p subrounded, dark red, 2.5 odor.	YR 4/ dor, da	6, yellowish amp graded,	_	SC			SS		V02-003-SS-001 lote: Interval 0.0 - 0.5 ft		Riser 0.75 in. Sch 40 PVC
5	2	54				0	SC							
10	3	58	(9.8 - 13.7) CLAYEY SANE medium density, fine graine poorly graded sand, no odd (13.7 - 20.0) SAND, poorly	ed, su or, dai	ib-rounded, mp ed, 2.5YR 8/1,	0	sc							— Open 2.25 in. diameter borehole
15	4	46	white, very loose, sub-roun damp	nded, 1	fine grained,	0	SP							
20	5	60	(20.0 - 25.0) SAND, well gr light reddish gray, medium loose, mild fuel odor, wet	raded, grain	, 2.5YR 7/1, ed, sub-angular,	- 0	sw		•	SO	N N	V02-003-S0-019 lote: Interval 19.0 - 20.0 ft		Screen (10.0 ft) 14.8 - 24.8 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
25			End of Borehole 25.0 ft bgs	S		28								End Cap
30-														

	FF / F	Are AFF Proje	erostar SES as (Savannah District F Site Inspection ect# M2032.0001 w Air Force Base	) E S S	BORING LC Start Date End Date Jorthing Easting Surface Elev. (ft)* Total Depth (ft)**	: 0 : 0 : 7 : 2 : 2	)1/26 )1/26 77898	(Pa /18 /18 39.58 378.3	age	3-00 1 of		Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dri Logged By	ter on pate	: Area 3 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/29/18 : 17.2 : Jeremy Klein
	INTERVAL	% RECOVERY	Water Levels <ul> <li>During Drilling</li> </ul> DESCRIMATION	*North A Datum ( **Below (bgs) fee		PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		porary Well: SHAW03-001 (TOC): 218.40
0	1	100	(0.0 - 9.6) CLAYEY SAND reddish brown, loose, fine sub-rounded, poorly grade damp	grained,		0	SC			SS		W03-001-SS-001 Note: Interval 0.0 - 0.5 ft		
- - - 10	2	48	(9.6 - 13.2) CLAYEY SAN loose, fine grained, sub-ro			0								— Open 2.25 in. diameter
- - - 15	3	46	(13.2 - 17.2) SANDY LEAN plasticity, 5Y 5/1, gray, me sub-angular, medium grain damp	N CLAY, dium stif	medium	0	SC							borehole 
	4	78	(17.2 - 20.0) SAND, well g yellow, sub-angular, mediu odor			0	sw		▼	so	Ν	W03-001-S0-016 lote: Interval 16.0 - 17.0 ft		0.010 in. Prepack machine slot Sch 40 PVC

AF			erostar SES		BORING LO Start Date End Date	: (	- S	(P) /18		3-00 1 of		Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi	ter	: Area 3 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface
7.4			eas (Savannah District F Site Inspection ect# M2032.0001 w Air Force Base	,	Northing Easting Surface Elev. (ft)* Total Depth (ft)**	:::	77900 21647 216.3 20.0	790.8				Abandonment D DTW During Dril Logged By		: 01/29/18 : 18.0 : Jeremy Klein
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	Water Levels During Drilling DESCRI	*Norf Datu **Bel (bgs)	surements th American Vertical m (NAVD88) feet (ft) ow Ground Surface feet (ft) ON	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		porary Well: SHAW03-002 (TOC): 217.93
0	1	100	(0.0 - 1.5) CLAYEY SAND, dusky red, sub-rounded, lo sand, no odor, damp (1.5 - 4.5) CLAYEY SAND, sub-rounded, fine grained, loose, no odor, damp	, 2.5Y	Doorly graded		sc			SS		N03-002-SS-001 Jote: Interval 0.0 - 0.5 ft		
5	2	50	(4.5 - 9.3) CLAYEY SAND, dusky red, loose, sub-roun poorly graded sand, no od	ded, f	ine grained	0	sc							Riser 0.75 in. Sch 40 PVC
10— - -	3	72	(9.3 - 13.4) CLAYEY SAND poorly graded, fine grained no odor, damp	d, subi	rounded, loose,	8	sc							— Open 2.25 in. diameter borehole
- 15 — - -	4	68	(13.4 - 18.0) SANDY LEAN plasticity, medium stiff, 5Y sub-angular, medium grain damp (18.0 - 20.0) SAND, well g gray, sub-angular, medium	5/1, g ned sa	ray, ind, well graded, , 2.5Y 7/2, light	13	CL		•	so	١	W03-002-S0-017 Vote: Interval 17.0 - 18.0 ft		Screen (10.0 ft) 9.8 - 19.8 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
- 20—			End of Borehole 20.0 ft bg:			12	sw							End Cap

AFFF	: A AF Pro	re Fl	as (Savannah District) F Site Inspection ect# M2032.0001 w Air Force Base		BORING LC Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	: ( : ( : 7 : 2	- S	(Pa /18 /18 32.18 354.9	age	3-00		Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dri Logged By	ter on ate lling (ft)	: Area 3 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/29/18 : 17.5 : Jeremy Klein
(bgs) (bgs) INTERVAL	% PECONERV		Water Levels During Drilling DESCRI	*Nort Datur **Bel (bgs)	surements h American Vertical m (NAVD88) feet (ft) ow Ground Surface feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		orary Well: SHAW03-003 (TOC): 218.25
0			(0.0 - 2.5) CLAYEY SAND, reddish brown, sub-rounde poorly graded sand, no odd	d, fine	e grained,		sc			SS		W03-003-SS-001 Note: Interval 0.0 - 0.5 ft		
1 - 5	10		(2.5 - 3.0) SANDY CLAY, h 3/3, dark reddish brown, m grained poorly graded sanc (3.0 - 4.0) CLAYEY SAND, loose, sub-rounded, fine gr sand, fuel odor, damp	ediun d, milo 2.5Y	n stiff, fine d odor, damp R 5/8, red,	0	CL SC							Riser 1.0 in.
2	5		(4.0 - 9.3) CLAYEY SAND, reddish brown, loose, sub-r grained poorly graded sand	round	ed, fine	0	sc							Sch 40 PVC
- 10			(9.3 - 13.2) CLAYEY SANI dark grayish brown, loose, grained poorly graded sand	sub-r	ounded, fine	0	sc							— Open 2.25 in. diameter borehole
- - - 15	7:		(13.2 - 17.5) SANDY LEAN plasticity, medium stiff, 5Y sub-angular, medium grain damp	5/1, g	ray,	0	CL							Screen (10.0 ft) 9.8 - 19.8 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
- 4	6		(17.5 - 20.0) SAND, well gr gray, sub-angular, medium odor			-	sw		V	SO	Г	W03-003-S0-017 Vote: Interval 16.0 - 17.0 ft		
20			End of Borehole 20.0 ft bgs			0								End Cap

Y       Y	AF	FF F	Are AFF Proj	erostar SES eas (Savannah District F Site Inspection ect# M2032.0001 w Air Force Base		BORING LO Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	:( :( :1	- S	(P) 5/18 5/18 00.03 211.3	age	4-0 1 of		Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dri Logged By	eter ion Date	: Area 4 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/29/18 : 14.5 : Jeremy Klein
(0.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     (2.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 10YR 8/1, white, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 10YR 8/1, white, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 10YR 8/1, white, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 10YR 8/1, white, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 10YR 8/1, white, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 10YR 8/1, white, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 10YR 8/1, white, medium grained, loose, no odor, damp     (9.5 - 14.5) SAND, poorly graded, 10YR 8/1, white, medium grained, sub-rounded, loose, no odor, section to the point		INTERVAL	% RECOVERY	▼ During Drilling	*Nort Datu **Bel (bgs)	th American Vertical m (NAVD88) feet (ft) low Ground Surface ) feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	l m	S	Sample ID		oorary Well: SHAW04-001 (TOC): 217.42
5     0     0     SC     SC     Sch 40 PVC       10     (9.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     0     SC     Sch 40 PVC       3     48     (9.5 - 14.5) SAND, poorly graded, 7.5YR 6/8, reddish yellow, medium grained, loose, no odor, damp     0     SP     Sch 40 PVC       15     (14.5 - 20.0) SAND, poorly graded, 10YR 8/1, white, medium grained, sub-rounded, loose, no odor, odor, wet     0     SP     Sch 40 PVC	-0	1	100	plasticity, 5YR 3/3, dark re sub-rounded, fine grained, no odor, damp (2.0 - 9.5) CLAYEY SAND, 5/8, strong brown, soft, sub	ddish poorl , low p b-rour	brown, y graded sand, plasticity, 7.5YR nded, loose,		sc			SS		Note: Interval		
10       reddish yellow, medium grained, loose, no odor, damp       0       SP       SP       Copen 2.25 in. diameter borehole         3       48       SP       SSP       SHAW04-001-S0-013       Note: Interval 13.0 - 14.0 ft         15       (14.5 - 20.0) SAND, poorly graded, 10YR 8/1, white, medium grained, sub-rounded, loose, no odor, wet       0       SSP       SSP       Screen (10.0 9.8 - 19.8 ft) 0.011 Screen (10.0 9.8 - 19.8	- 5 - -	2	76				0	sc							0.75 in.
15 (14.5 - 20.0) SAND, poorly graded, 10YR 8/1, white, medium grained, sub-rounded, loose, no odor, wet SP	- 10- - -	3	48	reddish yellow, medium gr			0	SP			so				
	- 15- - - -	4	40	white, medium grained, su	v gradu b-roui	ed, 10YR 8/1, nded, loose, no	0	SP		•					

AF	FF F	Are AFF Proj	erostar SES eas (Savannah District F Site Inspection ect# M2032.0001 w Air Force Base		BORING LC Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	: ( : ( : 7 : 2 : 2	- S	(Pa /18 /18 97.28 264.5	age	4-00		Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dri Logged By	y ter on ate ling (ft)	: Area 4 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/29/18 : 14.5 : Jeremy Klein
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	Water Levels During Drilling DESCR	*Nor Datu **Be (bgs)	th American Vertical m (NAVD88) feet (ft) low Ground Surface ) feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		orary Well: SHAW04-002 TOC): 217.14
-0	1	100	(0.0 - 3.0) CLAYEY SAND red, sub-rounded, fine grai no odor, damp	ined,	poorly graded,		sc			SS		W04-002-SS-001 lote: Interval 0.0 - 0.5 ft		
5-	2	76	(3.0 - 9.0) CLAYEY SAND brown, soft, sub-rounded, sand, soft, no odor, damp			0	sc							Riser 0.75 in. Sch 40 PVC
- 10- -	3	48	(9.0 - 14.5) SAND, poorly g reddish yellow, medium gr damp	grade ained	d, 7.5YR 6/8, , loose, no odor,	0	SP	//						— Open 2.25 in. diameter borehole
-    	4	40	(14.5 - 20.0) SAND, poorly white, medium grained, su odor, wet	/ grad lb-rou	ed, 10YR 8/1, nded, loose, no	0	SP		V	SO	١	W04-002-S0-013 Jote: Interval 13.0 - 14.0 ft		Screen (10.0 ft) 9.8 - 19.8 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
20-			End of Borehole 20.0 ft bg	S		0								End Cap

	F F	Are AFF Proje	erostar SES eas (Savannah District) F Site Inspection ect# M2032.0001 w Air Force Base		BORING LC Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	:(	- S	(Pa /18 /18 29.60 311.1	age	4-00 1 of		Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dri Logged By	ter on vate	: Area 4 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/29/18 : 13.9 : Jeremy Klein
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	Water Levels During Drilling DESCRI	*Norf Datu **Bel (bgs)	surements th American Vertical m (NAVD88) feet (ft) ow Ground Surface feet (ft) DN	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		oorary Well: SHAW04-003 (TOC): 215.60
0	1	100	(0.0 - 1.0) CLAYEY SAND, dark reddish brown, sub-ro loose, poorly graded sand, (1.0 - 4.5) CLAYEY SAND, medium stiff, 7.5YR 5/8, s sub-rounded, fine grained, sand, no odor, damp	, no oc , no oc , low p trong loose	d, fine grained, dor, damp blasticity, brown, e, poorly graded		sc sc			SS		N04-003-SS-001 lote: Interval 0.0 - 0.5 ft		Riser
5	2	76	(4.5 - 13.9) CLAYEY SANE sub-rounded, fine grained, sand, no odor, damp	D, 2.5 loose	YR 4/6, red, e, poorly graded	0	SC							- Open 2.25 in. diameter
- - - 15	3	54	(13.9 - 18.0) SAND, poorly yellow, medium grained, so odor, wet	<sup>,</sup> grado ub-rou	ed, 10YR 8/6, inded, loose, no	0			V	SO	1	N04-003-S0-013 Jote: Interval 13.0 - 14.0 ft		Screen (10.0 ft) 9.8 - 19.8 ft bgs 0.010 in. Prepack machine slot
-	4	50	(18.0 - 20.0) SAND, poorly white, medium grained, sul odor, wet	r gradu b-roui	ed, 10YR 8/1, nded, loose, no	0	SP							machine slot Sch 40 PVC
20			End of Borehole 20.0 ft bgs	S			·							

AF	FF /	Are AFF Proj	erostar SES as (Savannah District) F Site Inspection ect# M2032.0001 w Air Force Base	Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	: 0 : 0 : 7 : 2 : 2	- S	(Pa /18 /18 59.39 516.4	age		Drilling Mothod	: DPT : Brian Thomas ter : 2.25 in. on : Grouted to surface ate : 01/31/18
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	■ During Drilling	Measurements North American Vertical Datum (NAVD88) feet (ft) *Below Ground Surface bgs) feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	SAMPLE ID	Temporary Well: SHAW05-001 Elev (TOC): 252.90
0 - - 5	1	100	(0.0 - 2.0) CLAYEY GRAVEI 3/4, dark reddish brown, mer medium grained sand, sub-r graded, no odor, damp (2.0 - 13.2) CLAYEY SAND, fine grained, sub-rounded, p no odor	dium density, ounded, well 10YR 3/6, dark red,	0	GC			SS	SHAW05-001-SS-001 Note: Interval 0.0 - 0.5 ft	Riser
- - - 10-	2	88			0	sc					0.75 in. Sch 40 PVC
- - - 15—	3	62	(13.2 - 17.2) CLAYEY SANE 5YR 5/8, poorly graded, fine subrounded, loose, no odor,	grained,	0	sc					— Open 2.25 in. diameter borehole
- - - 20 — -	4	78	(17.2 - 18.0) SAND, well gra pink, sub-rounded, loose, no damp (18.0 - 22.0) CLAYEY SAND brown, medium density, sub graded sand, fine grained, n	o odor, fine grained, ////////////////////////////////////	0	sw sc					Screen (15.0 ft) 10.3 - 25.3 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
- - 25—	5	86	(22.5 - 25.5) SANDY LEAN ( pink, dense, stiff, sub-angula sand, no odor, damp End of Borehole 25.5 ft bgs	CLAY, 2.5YR 8/3, ar, poorly graded	-	CL			SO	SHAW05-001-S0-024 Note: Interval 24.0 - 25.0 ft	End Cap

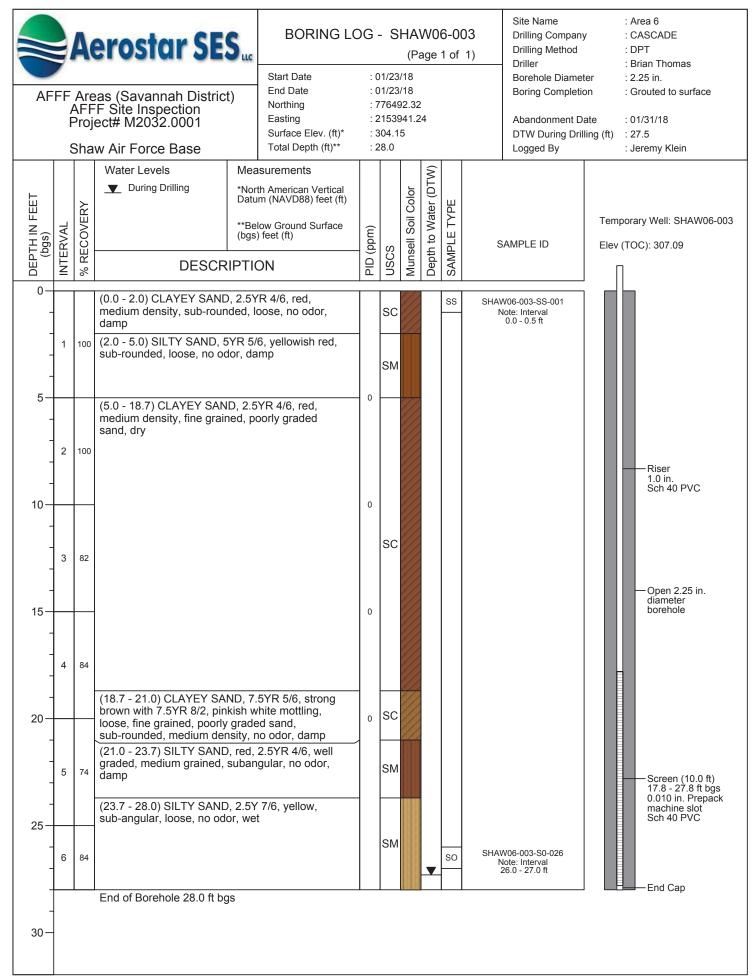
AF	FF	Are AFF Proj	erostar SES eas (Savannah District) F Site Inspection ect# M2032.0001 w Air Force Base	BORING LC Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	End Date         : 01/27/18           Northing         : 781102.62           Easting         : 2159828.92           Surface Elev. (ft)*         : 252.39						: Area 5 y : CASCADE : DPT : Brian Thomas ter : 2.25 in. on : Grouted to surface ate : 01/31/18 ling (ft) : Not Encountered : Jeremy Klein
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	▲ During Drilling     ★	Measurements North American Vertical Datum (NAVD88) feet (ft) **Below Ground Surface bgs) feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	SAMPLE ID	Temporary Well: SHAW05-002 Elev (TOC): 252.57
0	1	100	(0.0 - 2.5) CLAYEY GRAVEL 3/4, dark reddish brown, med medium grained sand, sub-ro graded, no odor, damp (2.5 - 12.2) CLAYEY SAND, medium density, fine grained poorly graded sand, no odor	dium density, ounded, well 10YR 3/6, dark red, d, sub-rounded,	0	GC			SS	SHAW05-002-SS-001 Note: Interval 0.0 - 0.5 ft	
- - - - 10-	2	74			0	sc					
- - - 15-	3	62	(12.2 - 17.2) SANDY LEAN ( strong brown, medium plasti medium density, fine grained sand, sub-rounded, no odor,	city, medium stiff, d, poorly graded	0	CL					
- - 20-	4	92	(17.2 - 24.0) CLAYEY SAND 7.5YR 5/6, strong brown, me density, poorly graded sand, sub-rounded, no odor. damp	edium stiff, medium fine grained,	0	sc					- Open 2.25 in. diameter borehole
- - - 25- - -	5	100	(24.0 - 28.6) SANDY LEAN ( plasticity, 7.5YR 6/1, gray, w strong brown mottling, stiff, c graded sand, fine grained, su odor, damp	rith 7.5YR 5/6, dense, poorly	-	CL					
- - 30- -	6	94	(28.6 - 32.0) CLAYEY SAND brown, medium density, fine graded sand, no odor, damp	grained, poorly	-	sc					19.8 - 34.8 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
- - 35–	7	98	(32.0 - 35.0) SANDY LEAN ( plasticity, 10YR 4/4, dark yel dense, fine grained, poorly g odor, damp Refusal - End of Borehole 35	llowish brown, stiff, raded sand, no		CL			SO	SHAW05-002-S0-024 Note: Interval 34.0 - 35.0 ft	End Cap

AFFF Areas (Savannah District) AFFF Site Inspection Project# M2032.0001 Shaw Air Force Base Water Levels Me					BORING LOG - SHAW05-003 (Page 1 of 1)           Start Date         : 01/27/18           End Date         : 01/27/18           Northing         : 780574.38           Easting         : 2160392.04           Surface Elev. (ft)*         : 245.66           Total Depth (ft)**         : 35.0							Site Name Drilling Compa Drilling Method Driller Borehole Dian Boring Comple Abandonment DTW During D Logged By	neter etion Date	: Area 5 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/31/18 : 28.0 : Jeremy Klein
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	▼ During Drilling	Datum (N **Below ( (bgs) fee	merican Vertical NAVD88) feet (ft) Ground Surface et (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		oorary Well: SHAW05-003 (TOC): 246.01
0— - - 5—	1	100	(0.0 - 2.8) CLAYEY SAND, reddish brown, loose, mediu grained sand, sub-rounded, odor, damp (2.8 - 15.3) CLAYEY SAND medium density, fine graine poorly graded sand, no odo	um dens , poorly ( , 2.5Y 8, ed, sub-re	sity, medium graded, no //1, dark red,	0	sc			SS		W05-003-SS-001 Note: Interval 0.0 - 0.5 ft		
- - - 10-	2	72				0	SC							
- - 15-	3	78				0								Riser 0.75 in. Sch 40 PVC
	4	64	(15.3 - 19.2) CLAYEY SAN yellowish red, medium dens poorly graded sand, dry	D, 5YR { sity, fine	5/8, grained,		sc							— Open 2.25 in. diameter borehole
20	5	86	(19.2 - 22.2) CLAYEY SAN reddish yellow, loose, fine g graded sand, sub-rounded, odor, damp (22.2 - 28.0) SAND, poorly g white, fine grained, sub-ang	grained, , mediun graded,	poorly m density, no 2.5Y 8/1,	0	sc	1////						
25- - - - 30-	6	56	(28.0 - 35.0) CLAYEY SANI reddish yellow, medium gra loose, poorly graded sand, i	ined, su	ıb-angular,		SP	1		SO	1	W05-003-S0-027 Vote: Interval 27.0 - 28.0 ft		
-	7	72		,			sc							24.8 - 34.8 ft bġs 0.010 in. Prepack machine slot Sch 40 PVC
35—			End of Borehole 35.0 ft bgs	i		I	I	11	<u> </u>	1	<u> </u>			End Cap

AF	FF F	Are AFF Proj	erostar SES eas (Savannah District) F Site Inspection ect# M2032.0001 w Air Force Base	Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	BORING LOG - SHAW05-004 (Page 1 of 1)           Start Date         : 01/27/18           End Date         : 01/27/18           Northing         : 780489.45           Easting         : 2160336.72           Surface Elev. (ft)*         : 245.60           Total Depth (ft)**         : 35.0							Site Name       : Area 5         Drilling Company       : CASCADE         Drilling Method       : DPT         Driller       : Brian Thoma         Borehole Diameter       : 2.25 in.         Boring Completion       : Grouted to su         Abandonment Date       : 01/31/18         DTW During Drilling (ft)       : 29.5         Logged By       : Jeremy Klein	
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	▲ During Drilling     ★	Measurements North American Vertical Datum (NAVD88) feet (ft) *Below Ground Surface bgs) feet (ft)	PID (ppm)	NSCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	s	SAMPLE ID		orary Well: SHAW05-004 TOC): 245.64
0— - - 5—	1	100	(0.0 - 14.2) CLAYEY SAND, dark reddish brown to dark re density, medium grained san poorly graded, no odor, dam	ed, loose, medium nd, sub-rounded,	0				SS		W05-004-SS-001 lote: Interval 0.0 - 0.5 ft		
- - - 10—	2	72			0	SC							
- - - 15—	3	78	(14.2 - 19.0) CLAYEY SAND yellowish red, medium densi	), 5YR 5/8, ty, fine grained,	0								Riser 0.75 in. Sch 40 PVC
- - - 20—	4	64	poorly graded sand, dry (19.0 - 23.0) CLAYEY SAND reddish yellow, loose, fine gr		0	sc							— Open 2.25 in. diameter borehole
-	5	86	(23.0 - 28.5) SAND, poorly g white, fine grained, sub-angu odor	medium density, no raded, 7.5YR 8/1,		SC							
25— - - -	6	56	(28.5 - 29.5) CLAYEY SAND reddish yellow, medium grair	ned, sub-angular,		SP SC	7/	•	SO		W05-004-S0-028 lote: Interval 28.0 - 29.0 ft		
30— - -	7	72	(loose, poorly graded sand, n (29.5 - 35) CLAYEY SAND, yellow, medium grained, sub well graded sand, no odor, w	o odor, damp 7.5YR 6/8, reddish p-angular, loose,		sc		*					Screen (10.0 ft) 24.8 - 34.8 ft bgs 0.010 in. Prepack machine slot Sch 40 PVC
35—			End of Borehole 35.0 ft bgs				//						End Cap

AF	FF F	Are AFF Proj	erostar SES eas (Savannah District) F Site Inspection ect# M2032.0001 w Air Force Base		BORING LOG - SHAW06-001 (Page 1 of 1)           Start Date         : 01/24/18           End Date         : 01/25/18           Northing         : 776549.45           Easting         : 2154067.92           Surface Elev. (ft)*         : 307.48           Total Depth (ft)**         : 33.0							Site Name Drilling Compal Drilling Method Driller Borehole Diam Boring Comple Abandonment I DTW During Di Logged By	eter tion Date	: Area 6 : CASCADE : DPT : Brian Tho : 2.25 in. : Grouted to : 01/31/18 : 29.2 : Jeremy KI	mas o surface
DEPTH IN FEET (bgs)	INTERVAL	% RECOVERY	Water Levels During Drilling DESCRI	*Norti Datur **Belo (bgs)	surements h American Vertical m (NAVD88) feet (ft) ow Ground Surface feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		nporary Well: / (TOC): 310.	SHAW06-001 44
0 - - 5	1	100	(0.0 - 14.0) CLAYEY SANE soft, medium density, fine o sub-rounded, poorly grade	graine	d sand,	0				SS		W06-001-SS-001 Vote: Interval 0.0 - 0.5 ft			
- - - 10	2	100				0	sc								1. 0 PVC
- - 15— -	3	78	(14.0 - 18.9) CLAYEY SAN angular, fine grained, poorl			0	sc								2.25 in. ter
- 20— - -	5	50	(18.9 - 22.8) CLAYEY SAN brown, fine grained, poorly sub-angular, medium dens (22.8 - 29.2) CLAY, light gr	grade sity, no	ed sand, o odor	0	sc								
- 25 - - -	6	78	medium plasticity, stiff, no				CL		▼	SO	1	W06-001-S0-028 Vote: Interval 28.0 - 29.0 ft		22.8 - 0.010 machi	n (10.0 ft) 32.8 ft bgs in. Prepack ne slot
30—	(29.2 - 33.0) SAND, poorly graded, 2.5Y 6/8, olive yellow, medium grained, sub-rounded, loose, no odor, wet         7       52         Refusal - End of Borehole 33.0 ft bgs						SP								0 PVC

Aerostar SES AFFF Areas (Savannah District) AFFF Site Inspection Project# M2032.0001 Shaw Air Force Base					BORING LC Start Date End Date Northing Easting Surface Elev. (ft)* Total Depth (ft)**	- S	(Pa /18 /18 16.42 043.8	age	Site Name Drilling Compan Drilling Method Driller Borehole Diame Boring Completi Abandonment D DTW During Dri Logged By	ter on late lling (ft)	: Area 6 : CASCADE : DPT : Brian Thomas : 2.25 in. : Grouted to surface : 01/31/18 : 27.3 : Jeremy Klein			
	INTERVAL	% RECOVERY	Water Levels  During Drilling  DESCRI	*Nort Datu **Bel (bgs)	surements th American Vertical m (NAVD88) feet (ft) low Ground Surface ) feet (ft)	PID (ppm)	USCS	Munsell Soil Color	Depth to Water (DTW)	SAMPLE TYPE	S	SAMPLE ID		orary Well: SHAW06-002 TOC): 305.40
-	1	100	(0.0 - 5.0) CLAYEY SAND, angular, well graded sand, loose, no odor,				sc			SS		W06-002-SS-001 Jote: Interval 0.0 - 0.5 ft		
5	2	100	(5.0 - 13.2) CLAYEY SANE medium density, fine graine dry			0	sc							Riser 0.75 in. Sch 40 PVC
- - - 15	3	82	(13.2 - 22.4) SILTY SAND, 6/8, poorly graded, subang odor, dry			0								— Open 2.25 in. diameter borehole
20	4	84				0	SM							
25	5	74	(22.4 - 23.6) CLAY, white 5 mottling, high plasticity, stif (23.6 - 24.1) CLAYEY SAN 5YR 4/6, poorly graded, su grained, loose, no odor, da	ff, no ID, ye Ibang Imp	odor, dry ellowish red, ular, fine	-	CH SC CH							Screen (10.0 ft) 19.8 - 29.8 ft bgs
	6	84	(24.1 - 25.0) CLAY, white, mottling, high plasticity, stif odor, dry (25 - 30) SAND, silty, stron poorly graded, medium gra loose, wet	5YR a ff, ver	y dense, no wn, 7.5YR 5/8,		SM			SO	١	W06-002-S0-026 lote: Interval 26.0 - 27.0 ft		0.010 in. Prepack machine slot Sch 40 PVC
30			End of Borehole 30.0 ft bgs	S			1		L					End Cap





Project Name:	SI AFFF MULTIPLE SITES (Savannah)	
ASL Project No:	M2032,0001	
Installation;	Shaw AFB	
Silve:	Arcal	
Date:	1/23/18	
Sample Technician:	J. Vointe	
Well ID No.:	SHANOI-MWIZIA	

		In	itial Measu	rements			
Well Total Depth:	¥a' 25.34	IL BTOC	Water Lovel:	15.91	# BTOC	Ś	
WELL VOLUME PURGE (only fill out if applicable)	E 1 WELL VOLUM	E = (TOTA	L WELL DEPTH	BTOC - STA			WELL CAPACIT
Calculated Well Volume:		Gallons	<u> </u>	Wel Diamet	ier: Z	inch	165
Calculations:	1° diameter =	0.041 gal/ft	2' 0	fiameter = 0,183	ge Mt	4º diaméter = i	0,663 gal/lt

## Well Purging Activites

Purging Method (pump type): Mansoon

Flow rate (incl. units): 1000 ml/mlg

'Time	Flow Rate (milimin)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	рH	Depth to water (BTOC )	00 (mg/l)	ORP	Total Gal Pumped	Comments
1152	1000	-		-	-	15.91	-	-	-	And sponstof Int.
1156	1000	648	21, 30	6.065	\$.\$7	17.43	6.51	-33.70	1.056	<u> </u>
200	1000	80.3	21.40	0.075	5.85	17.51	0.31	-49 40	2.112	
1205	1000	27.8	21.40	0.042	5.99	17.62	0.27	-61.0	3.44	
1208	1200	17.7	21,30	0.057	5.89	17.43	0.33	-58.7	4,39	
1213	1200	12.2	21,30	6.080	5.89	19.15	0.25	-74.7	5.98	
1217	1200	10,2	21.30	0.087	5.57	18.66	0.30	-79.9	7,25	
1219	1200	10.1	21.70	6.099	5.59	1900	6.33	-90.7	7.994	well Developed
			-					-		
				1.0		-	-			
			1	4	-		_			
_		-	- 27	Y			-	-		
	/	-	-							
-	/				1					
Danida	AL End Of Dumino	10.1	21.30	0 039		14 9.0	6.33	- 80.7	7.994	

Results At End Of Purging: 10.1 L1. 50 D.018 5.87 19.00 0.55 -80.1 7.184

COMMENTS: 7.7 Sallen's = Swell volumes. 0.264 galper nin 0.217 spm will development complete after 5 vell volumes of shalle permeters. 4

Fred 1/27/18

M2032.0001



Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation:	Shaw AFB
Site:	FORMER FIRE STATIONS TRAINING MEA 1 (APPE AREA 2)
Date:	01/23/18
Sample Technician:	A.willis / J. Venk
Well ID No.:	SHAWOI-MW122A

		In	itial Measur	ements		
Well Total Depth:	27.09	# BTOC	Water Lovel:	16.23	RETOC	
WELL VOLUME PURC	E: 1 WELL VOL					R) X WELL CAPACIT
(only fill out if applicab)	e) =	(27.09	FI - 16-29 FI)	× 0.163 milt -	1.77 04	
Calculated Well Volum	E 1.77	Gallons	1	Well Diameter:	2.0	inches
Calculations:	1* dismet	ar = 0.041 gel/tt	Zd	lameter = 0. 163 gal/	m 4" diam	eter 4 0.653 gal/ft

## Well Purging Activites

Purging Method (pump type):

Monsoon

Flow mo God unks: 1300-1600 m //min

Time	Flow Rate (mi/min)	Turbidity (NTUs)	Temp ("C} (	Cond (mS/Cm)	рН	Depth to water (BTOC	DO (mg/l)	ORP	Total Gal Pumpad	Commentis
1531	1300			-		16.30	-	-	-	Development initiate
535	1400	181	21,0	0.133	5.33			-2.6	1.48	
540	1600	18.0	20.8	0.140	5.40	17.42	0.93	-33.4	3.59	
545	1600 /	20.2	20.8	0.141						
1550	1600	1,30	20.2	0.139	5,45	18.42	0.85	- 326	7.81	
1550	1600	1.30	20.7	0.137	5.44	18.63	0. 82	-36.0	9.92	Developed
			-	m	0					
-		-		0	~	/				
_							_	-		
									_	
				1		-				
Regults A	I End Of Purging:	1.30	20.7	0.137	5.44	18.18	0.32	-36.0	9.92	

COMMENTS: 7.35 = Swell volumes

Well developed after purging 5 ( well evolutions and shall parameters.



Project Name:	SI AFFF MULTIPLE SITES (Savannah)	
ASIL Project No:	M2032.0001	
Installation;	Shaw AFB	
Site	Aren	
Date:	1/23/18	
Sample Technician:	J. V-INC	
Well ID No.:	SHAWOI - MWIOS	195

		Ini	itial Measur	ements			0.00
Well Total Depth: 21.8	8	# BTOC	Water Level:	13.75	n aroc	<u></u>	
WELL VOLUME PURGE: 1 (only fill out if applicable)	WELL VOLU			BTOC - STATE			K WELL CAPACI
Calculated Well Volume:	1.33	Gallons		Well Diameter	2	in	ches
Calculations:	1º diameter	= 0.041 galift	2" đ	ameter = 0.163 ga	4" diamotor = 0.663 galit		

Purging M	ethod (pump type):		0	ll Purgi Ø	-		inci, unita):	68	0 ~1L	Inin	
Time	Flow Rate (ml/min)	Turbidity (NTUs)	Temp (°C)	Cand. (m8/Gm)	рH	Depth to water (8TOC )	DO (mg/l)	ORP	Total Gal Pumped	Comments	
544	680	-		-	-	17.75	-	-		Development in	Hister
1550	680	\$.37	14.50	0.035				144.8	1.08		
1555	680	2.62	11.50					178.3	1,98		1
600	680	7.19	11.50	6.034	4.89	14.16	6.31	162.9	2.89		
1405	690	6.06	MAO	6.034	4.94	14.16	6,30	160.8	3.79		
1610	640	649	11.40	0.034	5.00	14.16	0.30				
1615	640	4.49	19.40	6.034	4.19	14.16	0.71	145.5	5.58	100 million - 100 million	
1620	680	5.39	14.40	PC0.0	503	14.16	0.22	131.1	6.48		a
623		4.75	14.40	0.034	4.98	14.17	0.25	13-10	7.02	Development	complet
				-				-		dana -	
-			W						1. 		3
	/	-									
-				-							
Raulto	At End Of Purging:	4.75	14.40	6.034	4.98	14.17	025	00.0	7.02		

COMMENTS: 0.18 yrm 5 well volmes = 6.65 jal Developmentst complete after 5 well volumes, stablightion reached. It Due to casing offset @ 200', neunsoon pump was unable to reach development depth. To overcome this a pp Bras used to develop the well.

M2032.0001

en 1/27/18



Project Name:	8I AFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation:	Shaw AFB
Site:	Aren Z
Data:	1/26/18
Sample Technician:	J. Vola IC
Well ID No.:	SHAWAZ-OCI

		In	itial Measu	rements			
Well Total Depth: 24.68	4	IT BTOC	Water Level:	18.30	) #BTO	1	
					STATIC DEPTH 1 gal/8 ~ 0.24		X WELL CAPACI
Calculated Well Volume: 0	26	Gallons		Well Di			inches
Galoulations: 1" diameter = 0.041 gaVit			2" (	ilameter = 0.	4° dismotor = 0.853 gai'it		

Well Purging Activites

Purging Method (pump type): \_\_\_\_\_\_

P۴

Flow rate (ind, units) 600 mL/mln

Timu	Flow Rate (mil/miri)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Depth to water (BTOC	DO (mgil)	ORP	Total Gal Pumped	Comments	
5942	600		-	-	-	15.30	-	-		Development 1	rectors
3446	600	304	19.5	0.047	6.201	**	4.17	-6.2	0.64		
0450	600	82.1	14.6			11	5.05	47,9	1.28		
0453	600	35.0	11.7	0.025	5.74		5.09	64.1	1.76		
0456	600	18.8	15,6	0,623	5.67		5.18	73.2	2.24		
0959	600	13.8	14.7	0.021	5.47		6.07	13.4	2.72		
1002	600	19.5	M.7	0.020	5.47		6,24	14.8	3.2		
1005	600	9.06	19.8	0.020	5,38	¥	6.24	104.8	3.68	Development	Complet
	-										
								-			<u>,</u>
				4-	-	-	_	-			
	-		-3	Y		1		-	1		
-			-						·		
		1				1			1.5		
Results	At End Of Purging:	4,06	19.4	0.020	5.38	XX	6.24	104.8	3.68		S

COMMENTS: Swell udames = 1.3 gal 0,16 gpm Development complete after purging over 5 well volumes & reaching stablightion ## One to well casing diameter both water level meter & polyflow are unable to fit down huk, No Oth data availble.

M2032.0001

C-23 AD 1/28/17

Aerostar SES ...

Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASI, Project No:	M2032.0001
Installation:	Shaw AFB
Sile:	Aren Z
Date:	1126/18
Sample Technician:	J. Volak
Wall ID No.:	SHAW02-002

		Ini	tial Measu	rements			
Weil Total Depth: 24,	82	RBTOC	Water Level:	17,88	# BTO		
WELL VOLUME PURGE: (only till out if applicable)	1 WELL VOLU				TATIC DEPTH 1 palm - <b>ሪ, ጊዬ</b>		X WELL CAPACI
Calculated Wall Volume:	85.0	Gallons		Well Dia		17	inches
Calculationa:	= 0.041 gabit	2* 0	diameter = 0.1	63 gal/fi	4" diameter = 0.653 gal/ft		

#### Well Purging Activites

Purging Method (pump type):

Flow rate (not units): 640 ml/min

Time	Flow Rate (milmin)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	рн	Depth to water (BTOC	DO (mg/l)	ORP	Total Gal Pumped	Commonta	Б. 
041	640			-	-	17.9%	-	-	-	Development	Dealins
1046	640	100	19.9	6450	5.89		3.13	-8.5	ORS	1 (11)	
050	640	31.4	20.3	0,042		1	1.72	-33.2	1.53		8
053	640	19.1	20,2	1100	6.10		1.48	-34.8	204		
1056	640	14,8	20.1	0.036	6.10		1.42	-27.4	2,55		
1059	640	10,8	20.2	6.036	6.05	1		-17.6	3.06	120-00-00	
102	640	8.91	20.7	10.034	5.49	V	1.41	-7,1	3.57	Development	Complete
		·			_						
				H	_	-	-				
	-	-	-	1				-			
~											
Raniba	At End Of Purging:	8.41	20.3	0.034	5.44	**	1.41	-7.1	3.57		

COMMENTS: Swell volumes = 1.4 sal 0,17gpm Development complete after purging over 5 well volumes & reaching stability parameters. ## Due to well casing liberates both writer level mater & polyplane cannot fit downhole. No Atw data available.

M2032.0001

C-24 C 1/27/18



Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032,0001
Installation:	Shaw AFB
Sile:	FORMER FIRE TRAINING AREA - AFFF SITE Z
Date:	1-26-18
Sample Technician:	A.willia
Well ID No.:	SHAW02-003

		In	itial Measurements
Well Total Depth:	24.72	ft STOC	Water Level: 17.92 ILETCC
WELL VOLUME PURG (only fill out if applicable			L WELL DEPTH BTOC - STATIC DEPTH TO WATER) X WELL CAPACIT FL - 1742FU x 0.041 man - 0.03 Gal
Calculated Well Volume	0.28	Gallons	Wall Diameter: 1 · 0 inches
Calculations:	1" diameter	= 0.041 gaVA	2" diameter = 0.163 gai/tt 4" diameter = 0.653 gai/tt

Well Purging Activites

Purging Method (pump type):

Peristatic

Flow take (Incl. units): 400 ml/min

Time	Flow Rate (mitmin)	Turbicity (NTUs)	Tamp (°C)	Cond (mB/Cm)	S <sup>pH</sup>	Depth to water (BTOC	DO (mg/l)	ORP	Total Gal Pumped	Comments
0935	400	-	-	-		×	-	-	-	Development ipilial
0940	400	393	19.6	0.148	6.80	1	1.05	-149.9	0.53	
0945	406	377	19.7	0.137	6.97		0.71	-165.0	1.06	
0950	400	297	20.0	0.133	6.90		0.39	-207,5	1.59	51 well volume
0955	400	200	20.0	0.127	6.92	12	0.36	- 222.9	2.12	Personal provide the
000	400	122.	20.0	0.120	6.90			2/9.1		S
1005	400	93.3	20.0	0.119	6.90		0.31		3.18	
010	400	65.5	20.1	0.119	6.19		0.30		3,77	
1015	400	53.6	20.7	0.117					4.23	
020	400	50.6	20.2	0.117	6.85				4.76	
1025	400	37.3	20.2	6.117	6.73				5.23	
1030	400	32.4	20.2	0.117	6.72	T	0.25	-2002	5.82	well Developed
					3					
				0	D	-		1		
						_				
						1		-		
Results A	t End Of Purging:	XX	20.2	0.117	4.72	Y	0.25	- 2002	5.82	

COMMENTS: & Due to size of well, both when and tubing could not fit -no what a recorded during development. \*\* Turtidity remaining his nation purging 5.82 gul

M2032.0001

And 1/27/18

7/12/18

1



Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032,0001
Installation:	Shaw AFB
Silex	Area 3
Date:	1/27/18
Sample Technician:	J. Vojak
Well ID No.:	SHAW03-001

		In	itial Measur	rements			
Well Total Depth: 21.7	71	# BTOC	Water Level:	15.62	# BTOC		
WELL VOLUME PURGE: (only fill out if applicable)	1 WELL VOL			BTOC - STAT			WELL CAPACI
Calculated Well Volume:	0.25	Gallons		Well Diamate	c 1"	Incl	hos
Calculations:	t" diamete	er = 0.041 gal/ft	2' d	iameter = 0.163 ge	4* diameter = 0.663 gaVit		

## Well Purging Activites

Purging Method (pump type):

PP

How rate (Incl. sinite): 500 ml/min

Time	Flow Rate (mVmin)	Turbidity (NTUs)	Tamp (°C)	Cond. (mS/Cm)	рН	Depth to water (BTOC	DO (ma/l)	ORP	Total Gai Pumpod	Comments	
ous	800	-	-	-	-	15.62	-	-	-	Development	Bestys
050	600	135	19,6	0121	5.87	1×	1.17	24.6	1.05		-
054	800	74.5	12.8	0.117	5.94	2010	6.47	5.6	1.89		
1058	800	58.5	19,9	0.114	5.92		0.39	1.3	2.73		
1103	800	28.5	19.9	0.112	SAL		032	-0.5	3.78	(1993) 1994 - Maria	
1107	800	17.8	19.9	6,10	5.86		0,26	1.6	4.62		
1110	900	19,7	19.9	0,109	5.86		0.24	0.5	5.25	1	
11/3	800	19.4	17.8	0,107		V	0.25	0.4	5.88	Development	f complete
				-				-			
-								13 - 18			
				t	1-	-					
		-		30					-		8
	/			1					-		
-							_				
Routh	ALEnd Of Purging:	18.4	14.8	0,109	5.91	XX	0.25	0.4	5.88		6

COMMENTS: Swell volumes = 1.255=1 0.215pm Development complete after pursing over 5 well volumnes t reaching stablization. #X Due to well casing timeter both water level meter & payflow could not fit hown hole. No DTW date numbble.

M2032.0001

C-26 A 1/27/18



Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.6001
Installation	Shew AFB
Sile:	Area 3
Date:	1/27/18
Sample Technician:	J. Noval C
Well ID No.:	SHA-J03-002

		In	itial Measu	rements			
Wall Total Depth: 21,	55	# BTOC	Water Level:	14.60	n BTO	C	
WELL VOLUME PURGE:	1 WELL VOLU				STATIC DEPTH		X WELL CAPACIT
(only fill out if applicable) Calculated Well Volume: 6	2.28	Gallons	H -MADH)		iameter: \"		nchas
Calculations: 1* dismeter = 0		= 0,041 gal/ft	1.041 galim 2* d		.163 gal/lt	4" diameter = 0.653 gaUtt	

Well Purging Activites

Purging Method (pump type):

PP

Flow rate (mel units): 600 -Umin

Time	Flow Rate (ml/min)	Turbidity (NTUs)	Tomp (*C)	Cond. (mS/Cm)	рН	Depth to water (BTOC	DO (hem)	ORP	Total Gai Pumpad	Commonto	
0440	600		-	-	-	14.60		-		Development	-Best.
-	600	OULS	19.1	UNIZ	5.83	**	2.36	-17.3	0.64		
0444	600	487	14.4	6075	5.81	(	1.20	-47.0	1.44		
0954	600	203	14.7	120.0	5.74		0.43	-32.6	2.24		
0958	600	112	19.6	0.056	5.68		0.67	-77.8	3.04		
1004	600	50.5	11.8	0.053	5.64		0.55	-21.0	3.84		
1004	600	27.1	14.6	0.052	5.39		0.46		4.14	a same land	
1012	600	20,0	19,6	0.051	5.57		OM7	-122	5.12		
1015	600	11.6	14,6	0.050			0,48	-4.3	5.6	251-27	
1014	600	7.72	14.6	6 .050	5,56	V	6.48	-8.5	6.08	Acuelopum cart	Complet
				111							
_				AA-					1		
/						-			-		
Results	At End Of Purging:	7.72	14.6	6.050	5.56	++	048	-8,5	6.08		1

COMMENTS: 0.16 gpm, swell volumes = in gal Development complete after purging over 5 well volumes & reaching stuble parameters. and the to well casing diamother both water level mater & poly flow could not fit down hole. Not PTW data available.

M2032.0001

C-27

COD 1/27/18

AerostarSES...

Project Name:	SLAPPF MULT/PLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation:	Shaw AFB
Silec	FORMER FIRE TRAINING AREA - AFFF SITE 3
Date:	01-27-18
Sample Technician:	Awillis
Well ID No .:	SHAN03-003

		Ir	iitial Measure	ements		
Well Total Depth: 2	1.17	ft BTOC	Water Level:	15.23	8 BTOG	
WELL VOLUME PURGE:	1 WELL VOLUN	E = (TOTA				WATER) X WELL CAPACIT
(only fill out if applicable)		(21.17	FI - 15.33FU x	0.041 gaun -	0.24 0	al
Calculated Weil Volume:	6.24	Gallons		Well Diameter.	1.0	Inches
Calculations:	utations: 1* dismolar = 0.041 galith			imeter = 0.163 gal	" diameter = 0.653 gal/ft	

## Well Purging Activites

Purging Method (pump type): \_\_\_\_\_\_\_ Per. sla.l.H.c.

Flow rate (Incl. units): 550ml/min

Time	Flow Rate (enl/min)	Turbidity (NTUs)	Temp {*C}	Cond.	Рн	Depth to weter (BTOC	DO (mg/l)	ORP	Total Gal Pumped	Comments
0937	550	-	-		-	×		-	-	Development in Hal
0945	550	OVER FRAME	19.0	0.131	6.42	- 100	1.29	-20.0	0.92	
0950	650	277	19.9	0.1710			0.54	-64.4	1.15	5 < well volument
0955	550	270	Z0.0	0.177	6.12		0,50	-64.7	2.35	
1005	550	38,5	2	0.175	6.11		0.50	-70,5		
1010	550	23.2	20.0	0.172	6.10		0.49	-624	4.5	
1015	550	(9.9	20.0	0.171		T	0.47	-67.6	5.2	Developed
~		1000								
					-	0				
						C><	-	-		
					11	_			1	
			-							
	LEnd Of Purging	19.9	20.0	0.11	6.10	*	0.47		5.2	~

COMMENTS: + are to give growell, both which and taking could not fit - no we down recorded during development.

Developed after purging a 2+6 and volumes w/ stable parameters and NFU, 220.

M2032.0001

C-28

7/12/18

AD 1/27/18

AerostarSES...

Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation;	Shaw AFB
Silo:	Area 3
Data:	1/24/18
Sample Technician:	J. Ugarc / A. Will's
Well ID No.:	SHAW03-FT3MUS

		In	itial Measu	rements			
Well Total Depth: 18,	21	H BTOC	Water Level:	15,15	R STOC		
WELL VOLUME PURGE: (only fill out if applicable)	1 WELL VOLUI	NE . (TOTAL	FI - 15.15FU	BTOC ST	ATHC DEPTH TO	WATER) X	WELL CAPACIT
Calculated Well Volume:	0.50	Gallons	1	Well Diam	eter: 1	inci	las
Calculations: 14 diameter = 0		= 0.041 galift	2*0	tiameter = 0.163	s galift	4" diameter = 0.653 gal/ft	

## Well Purging Activites

Purging Method (pump type): Monscol

Flow rate (act units): 1000 mL/mlm

C-29 6 1/27/18

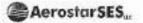
Time	Flow Rate (milmin)	Turbidity (NTUs)	Tomp (°C)	Cand. (#S/Cm)	pН	Depth to water (BTOD	DO (hgm)	ORP	Total Gal Pumped	Comments
511	1000	-	-		-	-		-		Avelopment Beg!
1517	1000	65.8	18.6	6030	449	15 13	3.35	2000	1.58	
1520	10000	143	18.7	0.031				312,3	2,372	
1523	1000	33.4	19.1	0.033	4.39	16.08	2.27	325.1	3.164	7 Swell volumes
526	1000	33.3	19.0	6,033	4.33	16,70	191.5	340.8	3.96	
1528	(000)	76.9	14.0	0034	4,36	16,70	2.32	342A	4.49	
1533	1000	29.3	14.1	0:035	4.30	16.72	1.20	353.1	5.81	
1536	1600	29.3	1910	0,035	4.37	16,72	1.96	348.5	6.60	
1540	1000	27.5	19.0	0.036	4.33	14,72	2.27	344,2	7.46	
1544	1000	143	14.0	0.036	4.39	15.68	2.06	345.5	8,72	Development Cum
				İ .						
			-	JV			1000		-	
	-			100						
-										
Results /	At End Of Purging:	143	19.0	0.036	4.34	568	2.06	345.5	8.72.	

COMMENTS: Swell volumes 2 2.5 gal. 0,264gpm After extensive development & stable parameters turbidity was unable to full below 20 NTM threshold.

M2032.0001

7/12/18

1



Project Name:	SLAFFF MULTIPLE SITES (Savannah)						
ASL Project No:	M2032.0001						
Installation:	Shaw AFB						
Silte;	Current Fire Station Area - AFFF site 4						
Date:	1-27-17						
Sample Technician:	A.willis						
Wel ID No.:	SHAW 04-001						

		In	itial Measureme	nts		
Well Total Depth:	22.52	IT BTOC	Water Level	14.22	B BTOC	
WELL VOLUME PURG	E 1 WELL VOLU	ME = (TOTA	L WELL DEPTH BTOO	- STATICI	PEPTH TO WATE	R) X WELL CAPACIT
(only fill out if applicable)	-	(22.52	Ft - 19.22 Ft) × 0.0	sti jahn -	0.54 00	
Calculated Well Volume	0.34	Gallons	W	ell Diamater:	1.0	Inches
Calculations:	1" diamotor	= 0.041 gaVR	2 <sup>e</sup> diameter	= 0.163 gal/t	4" diam	oter = 0.653 gaMl

## Well Purging Activites

Purging Method (pump type): Peristalfic

Flow rate (incl. units): 500 ml/min

Time	Flow Rate (millmin)	Turbidity (NTUs)	Temp (°C)	Cond.	рН	Depth to water (BTOC )	DO (mg/l)	ORP	Total Gal Pumped	Comments
1104	500	-	-	-	-	¥	-	-	-	Development in bal
1114	(240 GOD	900	13.2	0.048	5.85	1	3.77	71.2	1.32	Second Second
1120	500	203	18.5	0.042			3,63	72.9	2.11	55 well volumes
125	500	74.2	18.7	6.040			3.68	87.0	2.77	
130	400	45.3	18.7	0.033			3.69	90.0	3,43	Constant Constant State
139	600	46.4	18.7	0.038			3.65	81.3	4.09	
140	500 500	44.4	18.8	0.036	5.53			40.2	4.75	
145	506	41.0	18.8	0.036			3.70		5.41	
150	500	36.8	18.8	0.036	5,52		3.67	93.2	6.07	
150	500	31.7	18.8	0.035	5.83	T	3.70	95.8	6.93	Developed
-						-		-		
			-	1 2 5 5	100			6 - 6		
	1.00			-77	for					
								1.000		
								1		
Rosults	At End Of Purging:	31.7	18.2	0.035	5.53	¥	3.70	95.8	6.73	

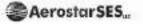
# COMMENTS: \* Due to size of well, both with out for how will down of fit - no will down recorded during development

Developed after purging a 19.79 well volume of stable parameter. Witchs coming down too slowly - we are on time restrict. Aren is silled clay.

M2032.0001

@ 1/27/18





Project Name:	SEAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032,0001
Instaliation:	Shew AFB
Site:	Asen 4
Date:	1/26/18
Sample Technicien:	J. VojnK
Well ID No.:	SHAW04-002

		Ini	tial Measurements	
Well Total Depth: 22,0	52	IL BTOC	Water Level 13,69 n BTOC	-
WELL VOLUME PURGE: (only fill out if applicable)	1 WELL VOLUM		WELL DEPTH BTOC - STATIC DEPTH TO WATER) X WE FL - 13.99F0 × 6.041 and - 6.34 of	LL CAPACIT
	0.34	Gallons	Well Disenster: 1" inches	
Calculations:	1" diamater =	0.041 gavit	2" diameter = 0.163 gsl/h 4" diameter = 0.653	galitt

Well Purging Activites

Purging Method (pump type):

pp

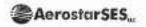
Flow rate (incl. units): 400 ml/mlm

Time	Flow Rate (mi/min)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	рH	Depth to water (BTOC	DO (mgm)	ORP	Total Gal Pumped	Commente	
634	400	-	-	~		13.69	-	-	-	Development	Best
632	400	Overange	13.0	0,082	5.87	**	4.15	69.7	0.53	1	
1443	400	439	18,3	2100	5.66		3.69	65.6	0,15		
1648	400	713	18,4		5.59		3,92	77,8	1.48		
1253	400	614	18.2	120.0	5,58		4,17	85.0	2.01	1.2.1	
1658	400	569	19.3	6,067	5.52		4,29	43.3	2,54		
103	400	536	18.3	0.066	5.40		4,36	104.7	3.07	-	
1708	400	474	18.3	0.065	SAZ		4,94	106.5	3,60		
515	400	475	18.3	0.064	5.42		4,35	110 M	4.13		
1718	400	427	18.2	0.064	5.42		4.47	112.4	4.66		
(25)	400	328	18.2	0.063	5.37	V	4,39	119.1	5.19		-
		1						-	-	-	
			- 10	4-	-	-					-
/											1
Resulta	At End Of Purging	328	18.2	0.063	5.37	**	4.39	118.1	5.19		1

COMMENTS: 0.106 gpm Swell volumes = 1.7 sel ## Due to well cashy diameter both water level meter & polyflow are mable to fix downhole. No DTW date available, Per Ash Willis call development @ 1723 due to lack of NTh reduction after extensive well volume purge.

C-31 0 1/27/18

M2032.0001



Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASI, Project No:	M2032,0001
Installation:	Shaw AFB
Sile:	Current Fire Station TRAINING AREA - AFFFSITEY
Cate:	1-26-18
Sample Technician:	Awillis
Well ID No.:	SHAW04-003

		In	itial Measur	rements		
Well Total Depth: 2	1.29	# BTOC	Water Level:	12.62	# BTOC	
WELL VOLUME PURGE:	1 WELL VOLUM					X WELL CAPACIT
(only fill out if applicable)	· · · · · · · · · · · · · · · · · · ·	(21.19	Ft - 12.V2Ft)	× 0.041 pl/	- 0.36 oa	
Calculated Well Volume:	0.36	Gations		Well Diamatar	1.0	Inches
Calculations:	1" diameter =	0.041 gal/h	2" d	iameter = 0.163 ga	4" diamet	er = 0.653 gain

## Well Purging Activites

Purging Method (pump type): Peristatic

Flow rate (incl. units):

Timo	Flow Rate (mWsin)	Turbidity (NTUs)	Temp (°C)	Good.	) <sup>рн</sup>	Depth to writer (BTOC	DO (mg/l)	ORP	Total Gal Pumped	Comments
1626	500			-	-	×		-		Ocvelopment , bilide
1630	500	over range	17.9	0.081	6-16		4.75	107.8	0.52	
1435	500	989 0	18.3	0.056			5.13	92.9	1.18	Sector Sector
1640	500	717	18.3	0.053			5.15	117.6	1.84	5 Cwell voluges
650	500	397	18.3	0,050			5.70	132.1	3.16	
1700	500	288	18.3	0.050			5.71	140.6	4.48	
1710	500	266	18.3	0.051	5.49	1	5.70	147.1		2000-0320-0-00-
1720	500	200	18.3	0.050	5.48	1		155.0		** Developes
									1	
			-	-	-	7				
1					X	2	ē.,	1 3		
			_				-	-	-	
									~	
Results At	End Of Purging:	200	(8.3	0,050	5.48	*	5.70	155.0	7.12	

COMMENTS: \* Due to size of well, with WLM and taking could not GF - no we dots recorded during development

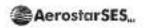
\*\* Developed after purging 20 well volumes. NTUS not conjug down

M2032.0001

00 1/27/18

Aerostar SES...

ASL Project No:	M2032.0001				_							
installation:	Shaw AFB											
Sile	Building 1611	- AFFF Site	6									
Date:	1/30/2018	16										
Sample Technician:	A. Wills U.Ke	det –										
Nell ID No.:	SHAWD5-001	HAWD5-001										
		In	itial.Mea	surements	5	~						
Well Total Depth:		# BTOC	Water Le	vet DRY		# BTOC						
VELL VOLUME PURGE:	1 WELL VOLUM	E = (TOTAL	WELL DE	PTH BTOC - 1	STATIC D	EPTH TO	MATER	X WELL CAPAO				
any fill out if upplicable)	*	(	Ft -	Fty ×	pabit	_	04 /					
calculated Well Volume: Gators				Well Dia	meter:		1	nches				
Calculations	1'' diameter =	0.041 gal/ft		2" diameter = 0.1	163 galit	1	d' diameter	= 0.853 gai/it				
Purging Method (pump type	$\sim$	vve	ai Purgi	ng Activites								
	1	N		Depth	· · · · · ·							
Time Flow Rate (milmin)	Turbidity (NTUs)	Temp	Cond. (mS/Cm)	pH water (BTOC	DO (mgli)	ORP	Total Gal Pumped	Commonts				
T DOWNER OF THE OWNER OF THE OWNE				pH water		ORP		Comments				
T DOWNER OF THE OWNER OF THE OWNE				pH water		ORP		Comments				
Territoria de la construcción de la				pH water		ORP		Comments				
T DOWNER OF THE OWNER OF THE OWNE				pH water		ORP		Comments				
T Design of the second s				pH water		ORP		Comments				
T DOWNER OF THE OWNER OF THE OWNE				pH water		ORP		Comments				
T DOWNER OF THE OWNER OF THE OWNE				pH water		ORP		Comments				
T Design of the second s				pH water		ORP		Comments				
T DOWNER OF THE OWNER OF THE OWNE				pH water		ORP		Comments				
Territoria de la construcción de la				pH water		ORP		Comments				
T STORE .				pH water		ORP		Comments				
Territoria de la construcción de la				pH water		ORP		Comments				
Territoria de la construcción de la				pH water		ORP		Comments				
Territoria de la construcción de la				pH water		ORP		Comments				
T Design of the second s				pH water				Comments				
Territoria de la construcción de la				pH water		ORP		Commentia				



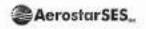
Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation;	Show AFB
Sito:	Aren 5
Date:	1/27/18
Sample Technician:	VelalC
Well ID No.:	SHADUS-002

		In	itial Measu	rements		
Wall Total Depth: 35.0	9	ft BTOC	Water Levet	31.81	t BTOC	2
WELL VOLUME PURGE:						TO WATER) X WELL CAPACIT
(only fill out if applicable)	40	( 33.04	FL - 31. WEFE	x 0.041 palm -		Gal
Calculated Well Volume:	0.13	Galiona		Well Diameter:	1"	inches
Calculations:	1 <sup>t</sup> diamete	er = 0.041 gal/fi	20	diameter = 0,163 gain		4" diameter = 0.653 gal/ft

Well Purging Activites

	ethod (pump type):			ur			inal, unha);		-	
Time	Flow Rate (milmin)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Con)	рH	Depth to water (BTOC )	DO (mgil)	ORP	Total Gal Pumped	Comment
~		Due to	de	pth	of	Wat	cr.		/	-
	/	which	ex(	reds	per	istal.	HC	/		
			Capo	bilit	es	the		1	2	
			_wi	11 6			1	4	h)_	-
			/	1 dr	40	sump	C	U	Le i	
						1	see	gri	eb sh	eet
Terrer	HIP-III		_		X	$\leftarrow$				
-					/	1				
				1			/			
				1			-	1	- 6 - 12	inter and
Results /	At End Of Purging:			/					V	
			/						1	<u> </u>
SPS	nts: 11 volumes :	= 0.65 g-1	/							$\searrow$

C CB427/17



Project Namer	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation:	Shew AFB
Site:	Area 5
Date:	1/27/18
Sample Technician:	J. Voluic
Well ID No.:	SHAWOS-003

		In	itial Measur	rements					
Well Total Depth: 35.	10	A BTOC	Water Level:	28.40	_	# BTOO	ž –		
WELL VOLUME PURGE:	1 WELL VOL						O WATER)	х	WELL CAPACIT
(only fill out if applicable)	- 11	(35.10	FL -2% SOFT	120.0X	gal/ft = 1	0,27	Gal		
Calculated Well Volume:	0.27	Gallons	L	Well Di	aneler:	1"		inch	és
Calculations:	1" diamate	r = 0.041 gaVtt	2* d	iamater = 0.	163 galift		4" clamete	ir = 0	1.653 gal/it

## Well Purging Activites

Purging Method (pump type):

PP

Flow rate (incl. unite): 400 m//m/m

Time	Flow Rate (mi/min)	Turbidity {NTUs}	Tamp (°C)	Cond. (mS/Cm)	рH	Depth to water (BTOC	DO (mg/l)	ORP	Total Gai Pumped	Commonts	
316	400	-	-	~	-	29.40		-	-	Development	Benchs
322	400	404	22.5	0,105	5.76	**	4.25	69.5	0.64		
1327	400	69.1	22.5	0.045	5.69		3.05		61,17		
332	400	30.8	22,5	0083	5.64		3.33	25.2	1,7		
335	400	24,3	22,5	6,078	5.57		3.85	84.7	2,02		8
1338	400	18.9	22.4	0.076	1.52		3,99	722	7.3		
341	400	17.9	22.3	0.073	5.52		3,99	14.3		Section -	
344	400	17.6	22.3	5.072	5.47	4	4,13	1029	2.17	Davelopment	Complet
			-								
				-Ve-	-			-		1	
_	/										
-								-			
Reads	At End Of Purging:	17,6	22.3	0.072	5.47	**	4.13	102.9	2.99		

COMMENTS: Swell volumes = 1.35 gal Oilo6 Spm Development complete after purging over 5 well volumes & reaching stablication 194 Die to well casing diameter both water level meter & polytlow cannot fit domethole. No other data available.

M2032.0001

C-35 0 1/27/18

AerostarSES...

Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation:	Shew AFB
Sile:	BUILDING 1511 - AFFF SITE 5
Date	1-27-18
Sample Technician:	A-willis
Well ID No.:	SHAWDS-004

	In	itial Measurements	
Well Total Depth: 3	4.84 natoc	Water Level: 27.97	t BTOC
WELL VOLUME PURGE:	1 WELL VOLUME = (TOTA	I, WELL DEPTH BTOC - STATIC DE	EPTH TO WATER) X WELL CAPACIT
(only fill out if applicable)	- (34.74	FI - 27.97 FI) × 0.041 path - 0	1.29 cu
Calculated Well Volume:	0 - 28 Galons	Well Diameter:	). O inches
Calculations:	1º diameter = 0.041 gaifft	2ª diameter = 0.163 galifi	4" diametar = 0.853 gai/it

Well Purging Activites

Perishaltic Furging Method (pump type):

550 mL/mi-Flow rate (incl. units): Depth 10 Flow Rate Turbidity Tamp Gond. DO Total Gal ORP Time pH water Commants (mS/Gen) (NTUs) (mgll) Pumped (mi/min) (°C) BTOC 1330 550 -Development i hithertad ы 550 550 550 550 5 < well volumes 1345 194.4 2.18 over range 19.4 21.7 0.050 5.55 4.61 21.9 0.045 5.22 72.0 0.045 5.21 2.1.9 0.045 5.20 353 4.99 160.5 2.91 5.00 165.9 3.35 5.02 165.2 3.79 Developed 10.0 356 5.70 The Results At End Of Purging: 5,70 21.9 0.046 5.20 + 5.02 165.2 3.75

COMMENTS: of Due to size g well, both well and lating could not eit - no WLDATA recorded during development.

C-36 1/27/17

AerostarSES...

Project Name:	SLAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032,0001
Installation:	Shaw AFB
Sile:	Aren 6
Date:	1/24/18
Sample Technician:	J. Voinic/A. Willis
Well ID No.:	SHADO6-001

		Ini	itial Measur	rements		
Wall Total Depth; 34.90	5	ft STOC	Water Level:	30,75	IT BTOG	
WELL VOLUME PURGE: 1 (only fill out if applicable)				BTOC - STAT		X WELL CAPACIT
Calculated Well Volume: d	717	Gallons		Weil Diamete	c 1	inches
Calculations	1ª diameter :	0.041 gaVit	2*d	iameter = 0.163 g	seft. 4" diamet	er = 0,653 gal/ft

Well Purging Activites

Purging Method (pump type):

PP

Flow rate (incl. unita): 250 mL/m/n

Time	Flow Rate (m//min)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	рН	Depits to water (ETOC	DO (mg/l)	ORP	Total Gai Pumped	Commenta	
1220	250		-	-	-	**	-	-	-	Development 1	Seglas
227	250	414	206	0,319	4.50	1	3.68	2245	0,462		
1230	250	226	20,5	0.318		1	3,70	252.3	0.66		
235	250	154	20.4	0.715	4.16		2.97	261.1	0,99		
1240	250	107	20,2	0.314	412		2,90	273.8	1.32	à	
245	250	78.4	20.3	0.315	4.07		3.14		1.65		
1250	250	61.5	20,2	0.315	4.96		3.26	and the second sec	1.98		1
1255	250	45	20.1	0.315	4.05		3.34	2826	2.31		E
1300	250	34.2	20.1	0.315			3.31	584.9	264		
1305	250	29	14.4	6.313	4,03		3.53		2.27		
1310	250	23.8	19.9	0,314			3.37	2861	3.3		
1315	2.50	19.5	20.1	0.315	401	7	3.52	286.1	3.63	Development	mplan
				36	-	-					
				3 4	-		-				
	I End Of Purging:	14.5	20.1	0.315	11 /01	AL M	352	294,6	2 /2		1

Swell volumes = 0.85 gallons, 0.066 ggm ## Dre to well casing diameter both water level meter & polyfluw are mable to tit Jownhole

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AerostarSES\_

Project Name:	ELAFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation:	Shaw AFB
Silox	Aren 6
Dete:	1/24/18
Sample Technician:	J. Vojak
Well ID No.:	SHAW06-002

		Ini	itial Measur	rements			
Wel Total Depth: 29.	76	IL BTOC	Water Level:	25.25	1 BTO	G	
WELL VOLUME PURGE: 1 (only fill out if applicable)	WELL VOLUME			BTOC - STATIC × 0.041 gain -			X WELL CAPACI
Calculated Well Volume: 🙆	18	Gallons		Wel Dismeter:			inches
Calculations	1* discostor = 0	Nileg 190.	2* d	fameter = 0.163 gal	ñ	d* diameter	r = 0.653 galitt

## Well Purging Activites

Purging Method (pump type):

14

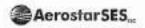
Flow rate (not, unite): 400 nL/min

Time	Flow Rate (milmin)	Turbidity (NTUs)	Temp (°C)	Cond. (m8/Cm)	pН	Depth to water (BTOC	DO (mg/l)	ORP	Total Gal Pumped	Comments	
1058	400	-	-	-	-	**	-		-	Development	Taldate
1102	400	44.3	20.05	0226	4.68	1	475	189.9	0.424		- the second second
1105	400	230	20.4	0.227			4.22		0.742		
1109	400	50.9	20.4	0,222	4.59		4.31	183.1	1.166		1
112	400	1.55	20,2	0.207	4.57		4.10		1.494		
1115	400	35.8	20,0	0.202	4.54		4.21		1.802		
1118	400	6.90	20.1	105.0	4.52		4,59	172.0	2.12		
1121	400	3.23	20,05	0,200	4.49		4.89	175.2	2.439		
1124	400	2.28	1.05	0.199	4,48	V	4.96	175.9	2.756	Revelopment	Complete
			1								
			-	H	-	1					
								1			
-								-			
Results	At End Of Purging:	2.28	1.05	0.199	448	++	4.16	175.4	2.756		1

COMMENTS: Swell volumes = 0.9 gal 0.106 gpn ## Due to even dimeter size both (water level) & polyfluw connet fit downhule. No Otw dute numbble.

C-38

(AN 1/27/18



Project Name:	SI AFFF MULTIPLE SITES (Savannah)
ASL Project No:	M2032.0001
Installation:	Shaw AFB
Sitn:	WASTE WATER TREATMENT PLANT . AFFF SITE G
Date:	01-24-18
Sample Technician:	Awim
Well ID No.:	SHANDO-003

		In	itial Measurements	
Well Total Depth;	28.85	A BTOC	Water Level: Z la . T & BTOC	
WELL VOLUME PURGE	1 WELL VOLUN	E = (TOTA	WELL DEPTH BTOC - STATIC DEPTH TO WATER) X WELL CA	PACE
(only fill out if applicable)		(29.75	Ft-24-75 Ft x 0.04   malifit - 8.08 Cal	-
Calculated Well Volume:	0.08	Gallons	Woll Diameter: J. 011 inches	
Calculations:	1" diamoter =	0.041 gal/īt	2" clamatar = 0.163 galift 4" clamatar = 0.653 galift	5

## Well Purging Activites

Purging Method (pump type):	Perist	altic
-----------------------------	--------	-------

Flows

Plow rate (incl. unite): 400 m //m:~

Time	Flow Rote (ml/min)	Turbidity (NTUs)	Temp (*0) <	Cond (nS)Cm)	рН	Depth to water (BTOC )	DO (mg/l)	ORP	Tobel Gal Pumpad	Commenta
0913	400	-	-	-	-	¥	-		-	Development in Hab
1922	400	50.4	20.0	0.166	5.26	1	3.16	28.9	0.951	Breedsprint in Hat 5 (Well Volumes
1930	400		20.0	0.152	5.20	- 5		27.5	1.792	States - Schultze Server I
5930	400	15.7	20.0		5.19	7	3.70	32.9	2.43	Well Developed
		<u></u>		/.	A	Ð	//			
								~	/	
					-	_				~ \
Results /	d End Of Purging:	15.7	20.0	0.150	5.19	×	3.70	32.9	2.63	

COMMENTS: I Due to site of well, bith habing and WLM could not fit - no WL Data recorded during development.

C-30 72 1/27/18

Aerostar SES.,

#### GROUNDWATER SAMPLING LOG

MUND SHA			- 102		1.1	114	Shaw AF	B		S. 1992		sant is a s	3.2.2
	wo1 - m	w105				werse St	14-301-1	uw105 - G	W-019	DA	# 1-3	15-18	
						PU	IRGING DA	λT.					
enilas. Devals Tapi (Inclusio	2.0 "		Lavo		TAD NO	st n	NAME SEPTIS	static of	PDI	3.75		un Peristal	li.
WELL VOLUME PI	URGE: 1 WEL	L VOLUME =	ITOTAL W	ELL DEF	TH BIDG	- STATIC L	EPTH TO W			2110	COLONA	Dr Ferfylei	40
state for accurate			1.000				0.16	por - 1.		<u>.</u>			
			· 41-1	50	15		0.16		20				
EGUIPMENT VOU Belyffawrfa		I EGUPMEN						* 0.10		ELL VOLUME gel			
AULA, FASP OF TURA DEFTE N WALLEAR	·· 10	9	PISA, PA	AP OF TU	ean 16	1909-00		INDAR ON 2		PURDER	555 TO	the volume Z	.31
CALL R CONTERNAL	VALUE	CAUS	_	PODGE .	OEPTH	14	1995	C000,	BISSU.		TUER		_
1946	PERDED Igational	VOLDE PLEOD AUROD	2.5 E	IBATE Hanniji	10 wates del titoca	and the second	୯୩	uddan.	ativas regit	H (\$44)	(LA)	(deco	bej plana
0250		-	- 0	.045	17.75	-	-	-			-	2 1 -	
0132	0.34	0.3	4 0	pas	14.05	5.12	17.2	0032	1.37	138.4	3.5	1 W	2 Pat
0137	0.42	0.7	0	280	14.05	4.80	17.4	0.072	2.10	> 144.6	2.4-	2 44	2 Pu
0940	0.255	1.02		Noss	14.07	4,96	17.5	0.072	1.54	142.1	1.18	a	110
0943	0.255	1,28	Ø	1085	14.07	4,99	17,6	0,033	1,29	\$ MO.S	3.7	And in case of the local division of the loc	man ministeriore
DAME	0.255	1.53	2	085	1405	5,06	17.6	0.034	1,04	1 1329	2.0	> 4ek	. Au
0449	0,255				14.05		17.6	0,034	0.70	the same price does not save the same save the same save the same save the	1,41	the second se	LA0
DASZ	0.255			_	14.05		12.8	0.034	0.65			a second s	2 Pet
0155	0,255	2.31	6	1085	14.05	5.11	17,4	0.01)	6.53	132.7	0.68	r an	Pe
				10					-	_			-
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	-				-				-		3		-
/	-		-			-	-	-					-
WELL CAPACITY ( TUBING INSIDE DI PURGING EQUIPA	A. CAPACITY	CALIFLY: 1/8	= 0.0000;	0/16*	- 0.0016 L	14" - 5.05 SP = Electri		- 6.854; SVP- PUERS PP	6" = 1.02; - 0.000; 12 - Perfetance Pr	2" = 0.010; 5.0	- 5.83 ' - 0.018 er (Specia)		
TUBING INSIDE DI PURSING EQUIPA	A. CAPACITY ( IENT CODES;	Gad.(FL): 1/8 B = Bailor	= 0.0000, BP =	ovi6* Recider i	- 0.0016 L	UN" - 0.00 SP = Electr SA1	an suite Subrems la	- 6.854; SVP- PUERS PP	0.000; 10	2* = 0.010; 5.4 me; 0 = 045	* - 0.018 er (Specia)	ALFIER	s
TUBINO INSIDE DE PURGINS EQUIPA MOREO IN (MART) /	A CAPACITY) ENT CODES: A TUADOS 1,	CALIFLY: 1/8	= 0.0000, BP =	ovi6* Recider i	-0.001/ [ Partic 20100	UN" - 0.00 SP = Electr SA1	an suite Subrems la	nami and	0.000; 10	2° - 0.010; 5.0 ме; 0 = 08 мента на <b>0 м</b>	-0.018 er (Specific) s.C.		5
TUBINO INSIDE DI PURGING ECLIPA MARINEO IN ANALY/ PUMP OR TUBISS	n capacity) ent codes: withing 1, 19	B=Baba NojnK	ASL	BV16* Reaction 1 Source Types	-0.0014 ( Partic 20100 000410 20100 000410	NAL- POIN SE- Electric SAN MODE		- LAIM, MP PMER PP STA	- 0.009; 42 - Podstatic Pr	2" = 0.510; 5.0 HTMP; O = Oth 0.009123-47; O AV V V V ( wet Type		anfuna analan 100	5
TUBING INSIDE OF PURSING EQUIPY AMPLES IT OPARTY / PUMP OF TUBING ENTER INVITATIONS	n capacity ( ENT CODES, VITURDON 1, 19 NUC	B=Baller B=Baller VojnK	ASL	BV16* Reaction 1 Source Types	-0.001/ ( PATEC ) 2000 000000	144" - 1.415 39" - Electro 344 99:35: 1160:80	n Sin Sitemath Pring Co Control	-6.314, 30° Ports PP STA	- 0.000; 42 - Pedisalis Pi	2" = 0.510; 5.0 HTMP; O = Oth 0.009123-47; O AV V V V ( wet Type	-0.018 er (Specific) s.C.	anfuna analan 100	**
TUBING INSIDE OF PURSING EQUIPY EXERCED IT OFFICIAL INFO OF TUBING INFO OF TUBING INFO OF TUBING	n capacity) ent codes: withing 1, 19	B=Baller B=Baller VojnK	ASL	Builder i Baudler i Bauer Instan Instan Instan Instan	-0.0014 ( Partic 20100 000410 20100 000410	144" - 5,415 157 - Elenie 544 14331: 116030 344		- 6.214, 30° - 0.214, 30° - 0.214, 90° - 0.214 - 0.21	- 0.000; 42 - Pedisalis Pi	2" = 0.510; 5.0 HTMP; O = Oth 0.009123-47; O AV V V V ( wet Type		anfuna analan 100	TH SUPPRINT FOR MAL
TURING INSIDE OF PORSING ECCIPY AND OF TURING OF THE REAL DWG REAL	а. сарастту ент ссоез, и чимпок 3, 19 лио пио соглакита	B-Balar B-Balar Vojak otcomanent recentral	- 0.0000 BP= /ASL	Builder i Baudler i Bauer Instan Instan Instan Instan		144" - 5,415 157 - Elenie 544 14331: 116030 344	to SUBY	- 6.214, 30° - 0.214, 30° - 0.214, 90° - 0.214 - 0.21	- 0.000; 10 - Parlitante Fr Filo-It-It-Itele Rito-Ite-Itele	27 - 0.010; 5.0 100; 0 = 000 10071040 MINITED AT, 0 10 V 0017100 0017100 0017000 0017000 0017000 0017000 0017000 0017000 0017000 001700 001 001		ALIFIERS SOBOLET. Rectiles APLANS BOLEPARM	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
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TUBING INSIDE OF FURGING EQUIPS HARDES IN AMOUNT INSIDE OF TUBING INSIDE OF TUBING INSIDE OF TUBING INSIDE OF TUBING INSIDE OF TUBING INSIDE OF TUBING	н. сарастту нент сообе; и чтанов: 1, пол на соятания колтания	Galarije ne B = Baler Vojak vecenanov recenanov recenanov recenanov recenanov recenanov recenanov recenanov recenanov recenanov	- 0.0000 BP = 1 /ASL	av16* Recider 5 Invisor Invisor Invisor Invisor Invisor Invisor Invisor Invisor		144" - 5,415 157 - Elenie 544 14331: 116030 344	to SUBY	- 6.214, 30° - 0.214, 30° - 0.214, 90° - 0.214 - 0.21	- 0.000; 10 - Parlitante Fr Filo-It-It-Itele Rito-Ite-Itele	2" = 0.010; 5.0 MIN, O = 0(h) 2.007109 MINITED 47; 0 M V MITTED 47; 0 M V MITTED 47; 0 M MITTED 48; 100 MITTED 48; 100 MITTED 50; 5.0 MITTED 50; 5.	0.019 or (Stecilit) SL 2 D X 1 ALLOCOP AN	NEFLES SEE X7. 100 Rectiles	TH SAUPLERS FLORE RAT Section
TUBING INSIDE OF FURGING EQUIPS HARDES IN AMOUNT INSIDE OF TUBING INSIDE OF TUBING INSIDE OF TUBING INSIDE OF TUBING INSIDE OF TUBING INSIDE OF TUBING	а. сарастту ент сооте: и проток 1, 19 по и соллакия и соллакия к соллакия 2		- 0.0000 BP = 1 /ASL ION PUR VOLUME PT	av16* Recider 5 Invisor Invisor Invisor Invisor Invisor Invisor Invisor Invisor		144" - 5,415 157 - Elenie 544 14331: 116030 344	to SUBY	- 6.214, 30° - 0.214, 30° - 0.214, 90° - 0.214 - 0.21	- 0.000; 10 - Parlitante Fr Filo-It-It-Itele Rito-Ite-Itele	2" = 0.010; 5.0 MIN, O = 0(h) 2.007109 MINITED 47; 0 M V MITTED 47; 0 M V MITTED 47; 0 M MITTED 48; 100 MITTED 48; 100 MITTED 50; 5.0 MITTED 50; 5.	0.019 or (Stecilit) SL 2 D X 1 ALLOCOP AN	namenen n namenen n n n n n n n n n n	

Revision Date: March 14, 2016

C-40 P 1/27/17

M2032.0001

AerostarSES...

## GROUNDWATER SAMPLING LOG

weiling stores		1014-	Calin	02-1		Shaw AFE	mwizla	- 6 14	072	005-01	100 1	19	
HIN JHM	101-m	W1244-	Aller	SFI		RGING DAT		0.04	014	01	124/	10	
WELL	0.5.11	23	10110	14.00	WHILE ACREMENTED	INCM CAPTA	anato men	Source	15 96		ROCPUMP TYP		
WELL VOLUME PU	2.0"	VOCUME -	TOTAL WAT	DEPTH ISTO	25.34 m -	EPTH TO WA	TERD X WELL	CAPACIEY	15.96	00	INALIZE P		
interfer to and the			25.3	1 " 1	5.96"	13 Alt	Van · A	38-	e.				
SOLEPMENT VOLU	WE PURGE 1	BOURPHIENT					TURING LONGTH	P+ FLOW(0)		5			
ONTERNE M	(dowler)		- 0	44 = 1	9-0426 -	22 m	° 0.20 **	.0	28				
WITH PLAP OF TUDES SOTTING WILL (Sets	12		18145 2504 24079134 W		22	P1.803 607143	MA HH	A 145	6 DUDED)	17 10	PURCES WE DA	. 0	70
0.282	VOLANE	CENIA. VOCON		Addi BRATH	jių Teskrainį	TEMP. Alto	CONE.	DX-SDLV CRIVES		1.1	deline	COLON Henceibel	0008 described
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656	-		0.	5 1549	6 -	-		-	-	-		Clean	HOAR
1702	5.5	0.3	_	the second second second	45.56	19.3	0.084			And in case of the local division of the loc	2.2	4	1
1705	2.15	0.4	and in case of the local division of the loc	or other statements of the local division of	0 5.58						1.4	11	11
110	0.25	0.7	0 0.	05 15.9	4 5.59	19.4	0-087	0.5	2 15.	211	6.6	+	t
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				_	-					-		-	
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		-			-	1				-		1	
WELL CAPACITY (	Cellons Per Fo	of: 0.78° + 0.	02; 5*=0.	04: 1.25'=1	A08: 2*=0.1	10; 3"=0.3	r; 4" = 0.65;	5' = 1.02	6'=1.47;	12 = 5.88			
TUBING INSIDE DV	CAPACITY (	GaLPR.): 109	+0.0009;	3/16" = 0.0014	1/4" = 0.00	20; 5/10"-	0,004; 3,0" = 0	and some of the second s	2"-0.010	5/8' = 0.01	a fee all a second s		
REAGING EQUIPM	ENT CODES	Dir Sader	(dp) = 35	iddar Pump;		x Subminible MPLING DA		Padstalitic P	ung, U=	Other (Spa	997		_
CARPLED BY PRATIA	MURINA A	willis	1451	DAUPLEA(2) 1985	ATURSIAN -	to	>		DROFIDS	1710	SALE LIVE	171	1
PLMP OR FLIDING	V.233.5	wants.	1A3C	TUSHIT			rai,	0.16.704940	Y	(4)	Files Sal		ine :
DEPTH WWELLINE	22			T C				Filicelten Starla	CLARINGATE	1 (1	7		
EN()	NA CONTRACTO	PERCENTIAN INCO	01 9.09	- <u>C</u>		Y COMPANY			C.F.C.F.C.		r -	24	AN S FIRST
SMALLOOF	ROMANNE	KONTERNEL DISCE	WOUMS GK.)	PROREMANT	226	TOTAL VOL.		inne vant	BTENDED AUD SIET		340412(3) EG 009		parestering
shindor-mining	A		4.5						19%	and .	APP	- 6	200
GW-022	2	PE	each	1			_		-		MIL	- 35	200
~	-		-		SA	100			-	<	-	-	
	-2	6	-		T	NA	-			-	-		
		-		-	-	-						1	
	-		-	- 11			-04					- 1	~
PENNINA											_		
NATERIAL CODEB			CB = Glear 6 for Parlituito I		Folyefrylese; Baller; 8P		opylons; S - Sil		Tefforç O albia Pump;	= Other (Sp	oolfy)		
SAMPLING EQUIPS													

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Cappen: all readings ± 20% axiantics, splicingly, ± 0.2 rept. or ± 10% (whichever is greater) Turbinity: of readings ± 20% (whichever is greater)

Revision Data: March 14, 2018

@ 1/27/7#2/18

AerostarSES...

## GROUNDWATER SAMPLING LOG

	101						Shaw AFI								
WHILING SHA	W01-1	MWIZT	zA			weiten St	HAWO	1-14	1224-	6-0-0	26 04	TE 1/2	31114		
						5 · · · ·	RGING DA	100110							
WELL DRMCTUP Owners	2	ľ	NAMES OF BRIDE	3/	6 7	A PA	IN NO		електи Алық рытала	. 16.3	1		GE PUNP TYP WEER	99	
WELL VOLUME P	I - I - I - I - I - I - I - I - I - I -							the second s	the second se	and the second se			10.01		-
(why fill and it is	application)		127.	PC	n -16	Non 16.	0.16	400 -	1.72	-					
			122	. 26			S		532	10711-2	2010/02/201				
EQUIPMENT VOL						ING CAPAO			ENGTH! + P						
justs fit out if a	pploaties	NIN	2.		P * 1		80		26	e	14				
BITCH, PLATE DR TURN COPTININ WELL SHIPS	" 26			NE- CHITLE WITTL Con		26	Parts	T I'A GROAD	112		PLANSING A	744	total, Voluai Puissillo gate	22	1
1000	VOLUME	CALL	_	PERSI	GEPTM	985	THEF.	COR		NOTOF NED	049	The	TRACET	GOLGE	obce
1446	POEDED Igalana)	90000		RALE (DEM)	TO WALTER	(standard) (stand	60	4.54		VIET.	(anti)		bund	(des cribe)	(FINDS)
1710		Calco	1		14.31			-	-				area a	-	-
1718	-	0.34		.085	and the second se	SAC		6 11 7	-	10	-16,4	7,0	1.5	00	Pet
1722	0.34	6.68		.085	11.49		18.2	0.11	the second se	60	-316		Contraction of the local division of the loc	and the owner where the	P.E.T
1726	6.34	1,02		485	1L.SO	5.85	18.9	0,12		30	-50.3	55		an	++
1730	0.34	1.36		015	16.51 16MS	5.87	18.9	0.12		.57	-62.7	6.9		an	++
	0.34	1.70	-	1085	a lasses of the	5,88	17.9	0,12		.54	-45.4	3,9		an	++
1738	0.17	1.87		085	1LAG	5,985	0.8				64.5	4.	of the local division	un	++
1740	6,17	2.04	_		- and the second	5.84	17.9	0.11		64	-45.6	6.5		an	
1744	0,17	2.21			16.46	and the second second second	18.0	0.116		57	-44.6	3.1		an	11
1144	tent	2, 51	- F	0.63	10.70	11305		10.00		121			<u> </u>	Hers	-
			-	-	1			-	-			1.200		-	-
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	1	<u> </u>	-	-	-			+							
WELL CAPACITY	(Galloris Par Fo	ot: 0.76° = 0	UQ; 1°:	0.04;	1.25" = 0.0	t; (2 <sup>*</sup> =0.1	6; 3°=0,3	17. 41-0.	66; S*=1	.m. (r.	1.47, 12'	+ 5.88		-	
	A. CAPACITY I							and the second se	1/8" = 0.038	the training of the second second	the local data was a second data was a	r* = 0.01B			
TUBING INDIDE D			. DP -	the other r	'ump; c	ESP = Electric	C DODERNOOD	a province of the second se	PP=Peib	otec munitic	Q=QB	ier (Spesid	9)		
TUBING INBIDE D PUBCING EQUIPS		n-name					IELING D					12.50			
PURCING EQUIPA	VENT CODES:		(A C)	Luger	ARTIC STREAM	SA			7	1000	1000	45	BANH.NO	174	>
PUBCING EQUIPS	MARMANDER 7)		'ASL	-	980000	SA			7	in D	GED AL 17		MARING MERCOAT	174	
	VENT CODES:		'ASL	TUNNE	980000	SA			1.00000	in D	V C	45	WE3DAT.	1745	-
PURCING EQUIPS Average or process same on tubos same myolic page	ANN COOPS ANNUAL J) 26 MED	VojaK/		TUNNE	N CODE PE	SAT PACRO TLABASE	V CITAN		1.00000	en Deciperant ?	V C	3	WEND AT		-
PURCING EQUIPA AMERICAN PROPAGA NAME ON TURNS SAFTIE PENNISS, page	ANNUAL COOPE: ANNUAL COOPE: AN	VojaK/		TUBBO BATER INTER	s G	SAT PACTO: TORMET	V CA DANA		1.00000	ini Delprovi 7 Delprovi 7 Dulp		ھ 1	MERCAR The Sol	DEWINT F	
PURCING EQUIPA AMERICAN PROPAGA NAME ON TURNS SAFTIE PENNISS, page	ANN COOPS ANNUAL J) 26 MED	VojaK/	508 P.P	т.нен- нитея ит т (		SAT PREN: TURNER DATA	V (1 public NC (1 public NC (1 public NC (1 public NC (1 public NC (1 public)		1.00000	en Decisionen 7 Decisionen 7 De	060 AE 17 Y ( HM KMAE Y	ھ 1	The last	DEWINT F	
PURCING EQUIPS Matrus at y factor Rase on TUBNS Sector PUBLS Sector PUBLS AU AU		Descentration	NOR PR	т.нен- нитея ит т (	s G	SAT PREN: TURNER DATA	V CA DANA		Plinet	en Decisionen 7 Decisionen 7 De	ALE AND ALE AN	D SNIDCH	AMPLASE COLOR	DEMINT F	NACE ALM DOM SAVE
PURCING EQUIPS Matrus at y factor Rase on TUBNS Sector PUBLS Sector PUBLS AU AU	VENT CODES VENT CODES VENT L ) 26 VENT VENT VENT	VojaK/ Deconomeno Pecencates	508 P.P	т.нен- нитея ит т (		SAT PREN: TURNER DATA	V (1 public NC (1 public NC (1 public NC (1 public NC (1 public NC (1 public)		Plinet	en Decisionen 7 Decisionen 7 De		D SNIDCH	MERCAR The Sol	DEMINT F	
PURCING FOURS ANAFOLIS IF PROTO NAFOLIS IF PROTO NAFOLIS IF NEEDER		Descentration	NOR PR	т.нен- нитея ит т (		5A PACRS 738960 945			Plinet	en Decisionen 7 Decisionen 7 De	ALE AND ALE AN	D SNIDCH	AMPLASE COLOR	DEMINT F	NIFLE FAIL DOW RATE permitted
PURCING EQUIPS Matrus at y factor Part on TURNS SPTE HYDRU plue AU OWERE GOODE		Descentration	NOR PR	т.нен- нитея ит т (		5A PACRS 738960 945	V (1 public NC (1 public NC (1 public NC (1 public NC (1 public NC (1 public)		Plinet	en Decisionen 7 Decisionen 7 De	ALE AND ALE AN	D SNIDCH		E T	NINE PLAN DOW RATE permittah
PURCING EQUIPS Matrus at y factor Rase on TUBNS Sector PUBLS Sector PUBLS AU AU		VojaK/ Increation Increation PE	NOR PR	т.нен- нитея ит т (		5A PACRS 738960 945			Plinet	en Decisionen 7 Decisionen 7 De	ALE AND ALE AN	D SNIDCH	AMPLASE COLOR	E T	NIFLE FAIL DOW RATE permitted

-E ± 0.2 units Temperatures ± 0.2 °C. Specific Considentiances: ± 5%. Disactived Dappen: ell readings ± 30% examinant, optionally, ± 0.2 repl. or ± 10% (whichever is greater).

Bevision Date: March 14, 2018

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## GROUNDWATER SAMPLING LOG

	MARCHERS AREAL		41				Shaw AFE	-	- ( -	121 00	= 11271	18	
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ſ	WED.	11.	TLR.	an 7	A . 100			NTMR: OR		.30	FURGE PUMP TY	PA	-
	WELL VOLUME PU	- 185 m		RETERIORIES 3.				Contraction and the second second			ORBAUER	PM.	
l	(interface) of a	Ngreen)	* 1	24.68	n - <b>18</b>	301 1	6.04	··· · 0,	26 .	161			
	EQUIPMENT VOLU	ptokki	NIA	•	#8 - I		<b>M</b> 1	TUBING LENG		#			
	NATUR, PLAP OR TURN DEFINITIS WELL doop	21	1	REAL PLAY OR TO DEPTH MINIMULE PA	et	21	-	172 Inter 172	the state of the s	the second se	TOPAL VAL DA	not le 3	and the second
	TRAS	VOLUME PORTED (gallere)	CUDA. NOLUBR PARCED INTIGOL	PSRoal RATE Assent	SEPTE 30 MATER Designation	pit Johandrat willig	100	cost. pairs	DBSSLVEI DERBA agt	( 049* (244)	\$106 \$106	(Anothe	() (Max
	1722	-	-	the second se	19.30	-	-	-	-	-	-	-	-
	1725	6.26	6.26		Name and Address of the Owner, where the	5.44	and the second se	0.018	6.72	217.5	77.7	SL:Op	
	1728	0.26	0.57			5.45		0.017	6.69	249.8		an	
	1731	0.26	0.75	And in case of the local division of the loc		5.43		0,017	5.81	2325	16.8	KLR	
ł	17 34	0.26	1.04	0.045				0.016	5.81	230.6	4.51	ar	
	7671	0.26	1.30	2800			2010	0,015	2.01	CADIE	-031		
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ł	WELL CAPACITY ( TURING INSIDE OF PURCING EQUIPM	A. CAPACITY (	(Galufith 148*)	0.0000; 3/107	+0.0114:	104* = 0.000 CSP = Elecci		- 0.004; 3/6 <sup>4</sup> -	5" = 1.02; ( 0.009; 107 • Perislañ : Pur	= 0.010, 5/8*	= 5.88 '= 6.0.18 or (Spacify)		_
1	NAMES AND IN THE OTHER	I seems	0.01	ACT In	Langli Marrin		///	11			CANFERD	174	A
	NAMPLECINT (PROTE) 24			TIM					ALID-JE TORET	PATER AT 173	S ENGED ALC	1/2	-
- 1	DEPTH WWELL MINE	2	1		WALSODE PE	/	-		Pitrathe: Explorer	The C	~	<	1.1
		PICE PLE CONTRIMENTS	DECONTRACTO	HE FUMP T	Ø		Y CENTRE		9	OPLICATE Y	<u> </u>		ANTIER
ŀ	annen oxo	FOR CONTRACTOR	MUTERICODE	vec.unit (-45	0065		104AL YES	FROM P	Conserved Geology	налық арастар РЕТИОС	ANDRON NAMPERING COL	station 1	
	01-64-021	2	1E	125	1			$\checkmark$		E44 93934	APP	-	320
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	angues	10+ +1						3693 <i>01</i>					

Revision Date: March 14, 2016

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## GROUNDWATER SAMPLING LOG

walkie 900030	4			12424	20.0	Shaw AFE	3			1.				_	
HALMA SHA	W02-0	02			MARKER 5	HAWIDA	- 003	2-64	1-07	12	643	. 01	- 27	- 12	
						RGING DA			Concernant Proved						
NALL DAVIETER (Jacking) WELL VOLUME PU (M) That (M)		L VOLUME = (1	10TAL WELL DE	етн втос	- BIANCO	EPTH TO WA	(TEP)	1221222	CAPACITY	17	9		RALEAU PARA	PP	_
EQUIPMENT VOLU			- ihuli-		194 <u>-</u>	1.	÷		. S	-	UPS LIME				
(mg) fill and it up		in the second		10 AL 200	0.00.26 ·										
NETHIC FASH INT PLANE DEPTHIC WELL OWNER	22		NUM NUM SRT DEPEK NUMBER		2a	PU809 80110	190 190 Att	174	5	1	PURSHO /	310	TOTAL VALUES RURSED (pelo	1.	25
346	VOLUUS PRIESZO Spelene)	CINAL VOLUME PARSED	PERSE RATE Gazeti	SO MARK	pil (stienturit ientus	1668. (PC)	10.00	(B) =	DBBOLS CEXCE mp1	ni -	\$WQ		REMONEY Return	COLOR (HIGHIDA)	0903 (Headed
1745	-	And the st	0.05	X	-	-	1	-	-	-	-	-		Chill	Petr
1750	0.25	0.2	and the second se		5.41	18.2	0.	610	5.0	3	100.6	3	48	L	1
1755	0.25	0.5			5,96			030	1.10		35.2		29	Clean	
1800	0.25	0.75	5 0.05		5,99	19.9					25.2	6	5,2		
1205	0.25	1,00	) 0.05		5.98	20.0			0,8		20.6	the second s	9.9		
1810	0.25	1.25	5 0.05	1	5,97	20.0	0.	030	0.8	1	19.4	1	1.7	4	+
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WILL CAPACITY R	Gelane Per Fo	x\$: 0,75* = 0.44	2: T*=0.04;	1.25" = 0.0	A: 2"=0.1	0. 3*=0.3	r. 17	+ 0.85; 3	r=1.02	Ø* =	1.47. 12	5.88		-	-
TURING MISIDE DV PURGING BOUTPW					ESP - Electric		Panip,	30° = 0 FP = 1	ensolitor	umpi	040; Lift 0+01a	= 0,011 = (8pm			
имиссору рентрии	FLATER O	wille I	<1) [30]	LEASE BISNAT	URENNE GF		in		10.00	2.600	10 AT 18	In	aven.an	181	
NAR CE TURBAS	11	Wild's Le	114		CQ.	$\sim$		1 env	-hideen	NIK		5	RIERDAT		/
RPTH WILL SHE		22	1.00	IGAL DODE PE	_		_	1.11	Weeksen Copelips	nest.Tg		2	~		57. 
2014	PIELONTAMER D	DECONTAGENTICS	e dan v	0		Y ( ridegala PLE HIESERWA	_		_	ECHI1	ishde i i	6	2	Int	PLEADE
	a somawine		(311MT(+6)	PRESERVATION OF COMPANY		fordel and GED IN FIELD del		10K php	nativoj	ATES	660 AWK,160 663400	ANDION	overfulsie co rabi	STACHT PL	ow strate
54AW02-002- 6W-022	2		each.	~							199,1276		AP	ρ.	200
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iennisa A	one to rector	ded du	f the wa	elli, bi v sany	pling.	L M and	d ku	bing 6	ould 1	n ał	4 F -	no	wh d	ates	
NATERIAL CODES		the second s	G = Closer Glass; Peristatio Para		iyatiyisma dat BP							ne (Slan	ah)	_	
Contraction of the local data			enros Flow Park	tallit: Purip;	SM = Ston		ting Gas	wity Dtain(;	0.0						

p81: ± 0.2 unlis: Temperature: ± 0.2 \*G. Specific Conductance: ± 5%. Discubled Doygen: all reactings ± 32% estantion; optionally, ± 0.2 mp1, or ± 10% (whichever is greater). Turbidity: all reactings ± 25 MTU; optionally ± 5 MTU; or ± 10% (whichever is greater).

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#### GROUNDWATER SAMPLING LOG

wainter Wittabas	ás.					10	Shaw AFI	в							11	10
MOLINO SHIPU	N03.00	53				INVESTIGATION S	HAW02	- 003	GW	-026	2	10	01E;	1-27	12	
						PU	IRGING DA						11.		1.4	
DAMENING DAMAG	1-0	1	THERE O	1/4	OD 2	1.68 m	MCL4.		ATC DEPT		17	.93	- 100	REEPENP TYP	PP	
WELL YOUWEPH		L VOLUME -	TOTAL	WELL DEP	TH BTOC	- STATICO	EPTH TO W	ATERI X	WELL.	CAPACITY	· · ·	. 12	10	CINER.	ri.	
lindy to out a	(provide)		-1 21.	48	" -1"	7.95 " +	140.0	865	· 0.5	9	9×					
EQUIPMENT VOLU INFERIOR		1 DOLIPMEN								6+FLOW						15
						0026 .	40 M	. 0 .	20	- 0	-25					
MILL FORFORTURS SIPTER PRIME FOR		0		PLAIP die 12 HVWEIL die		00	P540 6475	(TRO AT)	1700	9		PUSSING INCOME	172	FURSED Select	- 1.	25
THE	VOLUME	CURIN WOLL	21.0	PUNCE	06538	pH (Mandand	1089. (Pts	10	1	MEMORY I		dento	2003	densel	COLOR (described	FOOR
	(jathesa)	PURIO	03	tgano)	MATER	4630	17	12	2	rel		22.5		S633	22.10	(our tak
1700	-	-		0.05	*	-	-	-	÷			-	-		dard	Petro
1705	0.25	0.1	\$35	0,05	1	6.00	20.0	0.0	69	1.2	1	-37.4	6	26	LJ	1
1710	0.25	0.0		0.05		6.21	20.2	D. 0	60	Di	33	-115,1	3	2.1	CLEAR	
1715	0.25	D-7	5	0.05		6.31	20.2	0.0	58	0.2	7	-113.0	15	5.0	T	
1720	0.25	1.0	Ó	0.05	1	6.28	20.3	0.0	55	0.2	4	- 116.1	9	.82		
1725	0.25	1.2	5	0.05	5		20.3			0.2		-116.4	5	1.46	1	T
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WELL CAPACITY (										1	6"-	2012 0000	5.85			
FURING INSIDE DO PURGING EQUIPM	ENT CODES.	(Gal.S-1): 118 D = Defini	- 0.0006	Bladder P	- (1.0214; MARK	1/4" = 0.002 ESP = Electric	5; 5/6/ -	Pump;		000; 1/ Verintalitic P		0 = Othe	- 0.010 v 65pec			-
							PUNG DA					1210000	110	Sources		-
WHATER BALARRENTA	FELVOIDE A.	willis /	ASL	ZAMPS/	nikesisi etele	inter al	0				SAM	2040 17.	25	RECEIPTING AT	172	6
VWP DR TUBRIS	0.5	ANY CONTRACTOR	1	Lan	1			-	new			r ()	0	HONY KING	and the second second second	100
stene is two, doct	2				R. CORC PE	_		-	10	Fillantica Rappo			0			
DANT	TE GONTANER I	POST DEPOSITION	104 11	APP Y S	<u>e</u>	TUBNS	Y (DOBAGE)				0913	WE Y	C.	2	100	RENAP
GAMINE IS STOCK	исоналны	INTERNACION	VOLUMED	ne a	KSERWICKS	1.0	TOTHE VILL		anar ha isr	ane ( the last	MD	ABRANES	NUNDE	2007 SO CO.	INIDA PU	
544,053-007-	2	PE	125 each	1								EPO.587M		APP	2	00
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			-	+		-	_	-		-	-	-		~	-	-
New Y	the b	size of	well San	y wh pling	n wi	pane	turing	اول ه	not	61-	- No	wed	late	record	0.8	/
ATERNAL CODES:	AG = Ar	rber Giars,	CG - Cite	W Gives.	PE - Pol	allyiana;	PP = Pohpra	colorer.	S = Silo	na: T+	Telloo	G-Olte	ir Con	dire .	_	_
AMPLING FOURW		APP = AB	ter Perbia	Be Pamp;	D = De	in; 99.0	Stadder Pum	N ESI	P - Elect	nic Subytern	uitie P	ALLEY.	- Andrew			
		Read	oeverte E	ew Peristan		SM = Shaw	the second s	and the second second		the second se	现代简	peoty				

pN ± 0.2 units. Temperature: ± 0.2 °C. Specific Conductance: ± 6%. Discoved Oxygen: all reactings ± 20% networker, ± 0.2 mp1, or ± 10% (which ever is greater). Turbidity: all reactings ± 20 MTU; optionally ± 5 MTU or ± 10% (which ever is greater).

Navialon Sate: March 14, 2016

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GROUNDWATER SAMPLING LOG

MALLINC SHA	5004	mal			NELED PO	101-14	3-001-	Chine	16/ 04	= 1124/	17	
5 14	1005-1	001				RGING DA		610-0	1-10	116-61	11	
WELL	,//	In	NCS 78	. M		COLUMN COLUMNS	and the second	hr id	<b>C</b> **	FUNCE PLAP	A A 39/1	
Collection (instead)			METER Joshow 3				FREAM CH	MILETONIE 15	196	OF BALKE	PP	
WELL VOLOME /												
(and) Hi and R	al-by-protected		21.71	. 12	SZ .	0.04	um -0.	25 "				
ROUPMENT VOI	UNE PURGE:	1 COLIPMENT	VOL = PLMP VD	LUVE + (TU	BING CAPAG	ITY X	TUBHIQ LENKIT	HI + FLOW CE	L VOLUME			
(wb Next 1	applicable)	NA		24 - 1		113	+ pi		£9X			
MERIC POMPONYLA	··· 167	1. 1.	FRM. FUED GR 7	Celleu	19	Puss	ALL D.	,	PLIPERI() B	1018.90		
DEPTH IN WELL (Mark)	18	CLEME	FRESH FRESH	10934	1 10	1000	110.47: 114	illestor wep		263 PLEASED	couos	0008
TIME	VOLUME PRESED	VOLUM	2 1 1 1 2 Lot 1	10	prise dand unitsta	69	1000	COLUMN THE REAL PROPERTY OF TH	(1670)	0/241	(Desetting	1.000
	(galline)	PURGE	( Ostani	SWITH Red District	1.000	2000		rgiL	1 26		_	
1146	-	-	and the second se	15.52	-	-	-	-			-	-
1150	the second se	0.32	6.0)*	**	5.96	18.91	the second s	1.51	-33.1			Non
1154	6.32		0.074		5.89	M.I	0,113	6.79		22,1	ar	
1157	6.24	and the second se	0.074	_	5.88	14.2	0,109	6.60		13.0		Man
1200	0.24	and the second se	0.070		5.88		0.107	6.51	-321	8.26		Nom
1203	0,24	1.36	0.07	V	5.87	14.4	0,106	0.48	-31.3	6.48	KUR	Non
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WELL CAPACITY	Gallons Per Po	et): 0.757 = 0.	10; 1*=11DE	125' = 0.0	2'+0.1	0 3*+03	7; 4°≈6.65;	5"=1.02 6	*= 1.47. 12*	× 5.88		
TUBING INSIDE O	A CAPACITY	GALIFUS 1/F	= 0.0008; 3/16	-0.0014	147 = 0.00	8; 6/16"	0.001 19"=	0.008: 1/2"	0.010 54	= 0,010		
PURSING EQUIP	MENT CODES:	fl = Balloc	BP = Bladdo	Pump		15.0meskie MELING DA		Parkitable Pure	PL Ordh	er (Specity)		
MORTED BY PROTO	ATLANCE A	11 1 11	IACI MA	LORDE GONAT		11	1	6-	TRITED AT 12	ALL MARIN	120	1
SARFLED DY (PRHI)		Vajarci	HSL III	Sector and			70	LE-PL NIND		B /he b	and the second se	0
DOPTH ON WELL (Switz	18			UNAL CODE: PE	/		() ×	танны курроне		2	S	11771
		COCCUTIVATIVES	OR PYWY Y	G	and the second se	T Granter	and the second se		PIEATE Y	0	- 12	
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		4					ne,	882	5.8	2.0 2001 (2011)		

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 9% Dissolved Daygen: all readings ≤ 20% saturation; optionally, ± 0.2 mg/L or ± 10% (withhow is granter). Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (withhow is granter).

Revision Date: March 14, 2010

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AerostarSES.

#### GROUNDWATER SAMPLING LOG

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pH: ± 0.2 urbs Temperature: ± 0.2 °C Specific Conductance: ± 5% Discoved Oxygen: all readings ± 29% estantion; optionally, ± 0.2 mg/L, or ± 10% (whichever is greater) Turbidity: ull readings ± 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Revision Date: March 54, 2010

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Aerostar SES.

## GROUNDWATER SAMPLING LOG

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pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: of readings ≤ 20% saturation; optionally, ± 0.2 mgR, or ± 95% (which www is greater). Toobidity: all readings ≤ 20 NTU: optionally ± 6 NTU or ± 10% (which were is greater).

Revision Date: March 14, 2015

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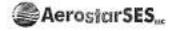
Aerostar SES.

## GROUNDWATER SAMPLING LOG

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NUMBER         O         # - (3-9024-16         N 1         O, 0         P - (2-924+6           NUME_CONSTRUCTION         10         Permission         1717         Number 2014         Numer 2014         Number 2014         Numer 2014 </td <td>ود الاند كالوسل</td> <td>(internet</td> <td></td> <td>18.21</td> <td>n - 15</td> <td>26"</td> <td>0.16</td> <td>um - 6</td> <td>0.47</td> <td>*</td> <td></td> <td></td> <td></td> <td></td>	ود الاند كالوسل	(internet		18.21	n - 15	26"	0.16	um - 6	0.47	*				
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173.5       0.25       0.90       0.05       15.27       5.10       17.1       0.032       2.30       74.8       2.42       1         174.0       0.75       1.15       0.05       15.27       5.10       17.1       0.032       2.75       2.221       1.5       -         174.0       0.75       1.15       0.05       15.27       5.10       17.1       0.032       2.75       2.221       1.5       -         174.0       0.75       1.15       0.05       15.27       5.10       17.1       0.032       2.75       2.221       1.5       -         174.0       0.75       1.15       0.05       15.27       5.10       17.1       0.032       2.75       2.221       1.5       -	1725	0.4	0,4	0 0.0			16.9	0.031			the second second	and the second se		
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TUBING RESE DA. CASACITY (Sell PS.): 100 = 6.0001;         100 = 6.0001;         100 = 6.0001;         100 = 6.0001;         100 = 6.0016;         100 = 6.018           PUNCING EQUIPMENT CODES:         B = Basker;         BP = Basker;         BP = Basker;         BP = Basker;         D = Other Stopping;         PP = Portskille Punc;         D = Other Stopping;           SAMPLING DEQUIPMENT CODES:         B = Basker;         BP = Basker;         BP = Basker;         D = Other Stopping;         D = Other Stopping;           SAMPLING DEQUIPMENT SET:         TUBE;         (4.5 L)         Versus and training;         TUBE;         D = Other Stopping;         TUBE;         D = Other Stopping;           SAMPLING DECOMPANY SET:         Masker;         Same         Same         Same         TUBE;         D = Other Stopping;         TUBE;         TUB:         TUBE;         TUB:         TU					-	<u> </u>	£.		-		+		-	+
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TUBING RESE DA. CASACITY (Sell PS.): 100 = 6.0001;         100 = 6.0001;         100 = 6.0001;         100 = 6.0001;         100 = 6.0016;         100 = 6.018           PUNCING EQUIPMENT CODES:         B = Basker;         BP = Basker;         BP = Basker;         BP = Basker;         D = Other Stopping;         PP = Portskille Punc;         D = Other Stopping;           SAMPLING DEQUIPMENT CODES:         B = Basker;         BP = Basker;         BP = Basker;         D = Other Stopping;         D = Other Stopping;           SAMPLING DEQUIPMENT SET:         TUBE;         (4.5 L)         Versus and training;         TUBE;         D = Other Stopping;         TUBE;         D = Other Stopping;           SAMPLING DECOMPANY SET:         Masker;         Same         Same         Same         TUBE;         D = Other Stopping;         TUBE;         TUB:         TUBE;         TUB:         TU					-	-	-	-			-	-		+
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PLINCING SQUEMENT COCCESE         B - Baller         RP - Elader Punc         EDP - Elader Suffrentility Punc         PP - Period Biol Punc         O = Other (Specify)           INVERSED BIT PRATURATIONS A.1-07/BLS         (4.3.1.)         Inversitive punction         Inversitive punction         Antificiant         TO HO - Specify         Inversitive punction         Antificiant         TO HO         Inversitive punction         Inversitive punction </td <td>WELL CAPACITY (</td> <td>Sallons Per Po</td> <td>at: 0.10"×9</td> <td>02; Y*=0.0</td> <td>04: 1.25° = 0.0</td> <td>0; 2" = D.1</td> <td>15; 37+0.3</td> <td>7; 4" = 0.45</td> <td>i; 57 + 1,02;</td> <td>67 = 1,47; 1</td> <td>7.45.88</td> <td></td> <td></td> <td>-</td>	WELL CAPACITY (	Sallons Per Po	at: 0.10"×9	02; Y*=0.0	04: 1.25° = 0.0	0; 2" = D.1	15; 37+0.3	7; 4" = 0.45	i; 57 + 1,02;	67 = 1,47; 1	7.45.88			-
SAMPLING DATA           SAMPLING DATA           Deprive reading and reading													_	
NUM-OF THREAD         PELLON EXTENSION         PELLON EXTENSION         PELLON EXTENSION         PELLON EXTENSION         PELLON EXTENSION         PERLON EXTENSION <td></td> <td></td> <td></td> <td>00" = 1008</td> <td>oder Punca</td> <td></td> <td></td> <td></td> <td>The providence of</td> <td>rung: G=C</td> <td>ener sapar</td> <td>9<b>3</b>1</td> <td></td> <td>-</td>				00" = 1008	oder Punca				The providence of	rung: G=C	ener sapar	9 <b>3</b> 1		-
NUM-OF THREAD         PELLON EXTENSION         PELLON EXTENSION         PELLON EXTENSION         PELLON EXTENSION         PELLON EXTENSION         PERLON EXTENSION <td>UNIFUED IN PRODUCT</td> <td>HUNDER A4</td> <td>allis ,</td> <td>(Lal)</td> <td>SAUFFLERIN SUSPER</td> <td>URG (d):</td> <td>a</td> <td>&gt;</td> <td></td> <td></td> <td>140</td> <td>100000000</td> <td>174</td> <td>3</td>	UNIFUED IN PRODUCT	HUNDER A4	allis ,	(Lal)	SAUFFLERIN SUSPER	URG (d):	a	>			140	100000000	174	3
Interest contraction         Interest of the second material         Interest of the second material material material ma	and the local division in the local division		acter -	4101	518914		~		PERMIT	the second se	65		1.1	-
Skiller         Contraction         Skiller	DEPTHENWELLOWS	16			MATERIAL CODE: PC			-	Phone by/			2001154		-
MATERIAL CODES:         AG = Argher Galar;         CG = Clear Galar;         PE = Polymotylene;         PP = Polymotylene;         S = 5580001;         T = Tabler;         D = Other (Bpecty)			And the second s	rahi mukir	10			-		DORCHARE (	1) "			
Skitter-bil- Sk		and and the			- 0300362	1953.000196		TINN	L phij Stanand Ownaj				angen 1	
А-FT MWS-GU PUL 2 PG 125 хм <sup>-1</sup> PG 20 REMUSEE MATERIAL CODES: AG = Argber Glass; CG = Clear Glass; PE = Pd polypopylene; S = 586cm; T = Taltor; D = Oline (Bpectly)		5-2	PE		/					EW 2274		HPP		20
REMARKE MATERIAL CODES: AG = Agabar Galax; CQ = Clear Galax; PE = Polymotylana; PP = Polypoopylana; S = Silicona; T = Talbar; D = Odinal (Bpecily)		946 2				X		-	-		Ephessim		_	20
HATERIAL CODES: AG = Agency Geaux; CG = Clear Geaux; PE = Polynotylene; PP = Polycopylene; S = Silicone; T = Tellor; D = Other (Specify)	~					-				-			-	
HATERIAL CODES: AG = Agency Geaux; CG = Clear Geaux; PE = Polynotylene; PP = Polycopylene; S = Silicone; T = Tellor; D = Other (Specify)			28	1		_			-	-		~	~	~
HATERIAL CODES: AG = Agency Geaux; CG = Clear Geaux; PE = Polynotylene; PP = Polycopylene; S = Silicone; T = Tellor; D = Other (Specify)				-		-			-	- C			_	
	RENARD													
SAMPLING EQUIPMENT CODES: APP # Anny Portisatio Purso. B + Ballie: Purso. ESP + Enddo Schmonible Purso.			the second se	statement of the local data and the second statement of the second statement o	or some strength and a second strength of the						Odhet (Spe	c Itý		_
RFPP = Reverse Flow Peetd after Plang; SM = Stow Method (Tulking Growity Dualt): O = Other (Spa dily)	SAMPLING EQUPP	NEMT CODES												

Revision Date: March 14, 2016

C-49 (1/27/18 7/12/18



GROUNDWATER SAMPLING LOG

- W		M2032.0			1000000		STALLATION	211014	VAPM			
	ELL NO:	SHAWO	4-001-		SAMPLE		N 64- 00	21 - GW	- 918	DATE (-	-28-1	8
1.00	ELL		T WINNING		1	LL SCREEN	and the state of t			Lauro a	and the state and the second	
Di W	AMETER ELL VOI	R (Inches): 1-5 UMIL PURGE: t if applicable)		TER (Inches): JUME = (TOTA	V4 00 DEF	PTH - STA	INC DEPTH	TO WATER) X	ER (feet): 4 WELL CAPAC		ALER P	931
EC	QUIPMEN		URGE: 1 EQU	= ( 22 IPMENT VOL.	= PUMP VOI			STY X T		ealigns/cot + FLOW CELL + K2 • 2 D		9 <sub>gallo</sub> .25 <sub>gallo</sub>
		MP OR TUBIN WELL (feat):	18	FINAL PUM DEPTH IN W	P OR TUBINI	and the second second	PID RE	SULTAY EAD (PPM): 0	PURGING ENDED AT:	1010	TOTAL VOLUN PURGED (gulk	IE
	TIME	VOLUME PURGED (gallons)	CUMUL VOLUME PURGED (aslians)	PURGE BATE (sem)	DEPTH IO WATER (leat)	pH (standard (stang	IEMP. ĈG	COND. (circle anits) amhos/on a ASIGN	DISSOLVED OXYGEN (clock units) mail_br % initiation	TURBIDITY (NTUs)	ORP (mb)	ODOR COLOI (describ
11	440	0	0	0-05	*	-	-	n	-		-	Clarke
10	445	0.15	0.25	0.05	1	5,07	17.7	0.034	5.83	184	166.0	1 1
14	1	0.25	0.50	0:05		5.02	17.8	0.032	5.75	66.4	145.3	Char
	155	0.25	0.75	0.05		5.03	12.7	0.032	5.73	56.5	165,2	1
12	500	0.25	1.00	0.05		5,09	17.9	0.031	3.73	35,9	166.4	11
IS	05	0.25	1.25	0.05		5,10	17.8	0.031	3.72	27.2	167.7	11
	510	6.26	1.50	0.05	1	5,09	17.7	0.031	3.72	19.7	170.3	1
E				-		(i	-aprogram					
				-			SX					
			4		<u>1</u>							
		ACITY (Gallon SIDE DIA, CAR		.75" = 0.02; 11 1/8" = 0.00	1" = 0.04; 00: 3/16"	$1.25^{\circ} = 0.00$ = 0.0014;	1; 2 <sup>4</sup> = 0.1 1/4" = 0.003					
-		EQUIPMENT O	CONTRACTOR OF STREET		P = Bladder P	200 Y 1 20		Submersible Pur	A CONTRACTOR OF A CONTRACTOR O	ristatic Pump;	0 - Other	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			10.000 APA	onovedi en		SAMP	LING DA	ATA				1.1
84	Ainell	BY (PRINT) / A	FFILIATION:	8	AMPLER(S)		(S)		SAMPLING INITIATED AT	ISIO	SAMPLING ENDED AT:	1511
1	IMP OR'	TUBING WELL (Ison):	12	1	UBING ATERIAL CO	PE			FILTERED Y	0	FILTER SIZE	µm
-PU				1.5	ALL DOAL OF	ODE				NU.		
PU			DNE PUIM	Contraction and the second			V Con	Contraction of the local division of the loc	DUP ICATE	v /		
PU	ELD DEC	ONTAMINATIK		° Y T	>	TUBING		aplaced)	DUPLICATE:	, Y (	N)	ALC: NO
PU DE FIL SA	BAMP BAMP		R SPECIFICA		RESERVATI	TUBING SAMPLE PR		aplaced) M	The second se	D SAA	IPLING S/	LOWRATE
PU DE FIL SA	BAMP BAMP	CONTAMINATION PLE CONTAINE CONTAINERS	ER SPECIFICA MATERIAL CODE		) REŜERVAŬ USED	TUBING SAMPLE PR	ESERVATIO	aplaced) M	DUPLICATE INTENDE ANALYSIS AN	D SAA IDJOR EQU	IPLING S/ IPMENT I ODE (n	MPLE PUM LOW RATE
PU DE FIL SA	BAMP BAMP MPLE CODE	CONTAMINATION PLE CONTAINE CONTAINERS	ER SPECIFICA MATERIAL CODE		) REŜERVAŬ USED	TUBING SAMPLE PR	ESERVATIO	mL) PINAL	DUPLICATE: INTENDE ANALYSIS AN METHOD	D SAA IDJOR EQU	IPLING S/ IPMENT I ODE (n	LOWRATE
PU DE FIL SA	BAMP BAMP MPLE CODE	CONTAMINATION PLE CONTAINE CONTAINERS	ER SPECIFICA MATERIAL CODE		) REŜERVAŬ USED	TUBING SAMPLE PR	ESERVATIO	mL) PINAL	DUPLICATE: INTENDE ANALYSIS AN METHOD	D SAA IDJOR EQU	IPLING S/ IPMENT I ODE (n	LOWRATE
PU DE FIL SA D	BAMP BAMP MPLE CODE	CONTAMINATION PLE CONTAINE CONTAINERS	ER SPECIFICA MATERIAL CODE		) REŜERVAŬ USED	TUBING SAMPLE PR	ESERVATIO	mL) PINAL	DUPLICATE: INTENDE ANALYSIS AN METHOD	D SAA IDJOR EQUID	IPLING S/ IPMENT I ODE (n	LOWRATE
PU DE FIL SA	BAMP BAMP MPLE CODE	CONTAMINATION PLE CONTAINE CONTAINERS	ER SPECIFICA MATERIAL CODE		) REŜERVAŬ USED	TUBING SAMPLE PR	ESERVATIO	mL) PINAL	DUPLICATE: INTENDE ANALYSIS AN METHOD	D SAA IDJOR EQUID	IPLING SUPPORT	LOWRATE
PU DE FII SA 10	SAMF SAMF WPLE CODE		ER SPECIFICA MATERIAL CODE		) REŜERVAŬ USED	TUBING SAMPLE PR	ESERVATIO	mL) PINAL	DUPLICATE: INTENDE ANALYSIS AN METHOD	D SAA IDJOR EQUID	IPLING SUPPORT	LOWRATE
PU DE FIL 80 80 80 80	ELD DEC GAMP MPTE CODE VM - C2 VM - C2		R SPECIFICA MATERIAL CODE PE Q	P Y TO TION VOLUME P Statenth	RESERVAN USED N/A	TUBING SAMPLE PR ADDE N ADDE		mL) FINAL MINAL N/A N/A	BUPLICATE INTENDE ANALYSIS AN METHOD 537 m	BUOR EOU	no 6 w	2000 2000 2000
PU DE FIL 80 10 ₹- \$0[	ELD DEC SAMP MPLE CODE SM - 073		R SPECIFICA MATERIAL CODE PE PE AS Size e AS = Ambor G	P Y TO TION VOLUME P Statesch	NIA USED NIA GU & Isar Gass:	TUBING SAMPLE PR ADDE N ADDE	ESERVATIO OTAL VOL D IN FIELD ( IA Z GATOL Otylene;	mL) FINAL MINAL N/A N/A	BUPLICATE: INTENDE ANALYSIS AN METHOD 537 m 537 m 6 cold Most me; 8 = Sillos	BUOR EOU	No 6 W	2000 2000 2000

Weakhore: Kaining-

M2032.0001

19 7/12/18 Aerostar SES ...

GROUNDWATER SAMPLING LOG

NAMES AND ADDRESS OF

eron/ware 162/02/06/0	ř.				Size.	Shaw AFE	3					
WALL NO S	HAWOU	1-002			MPLZIO: SH	AWAY .	- 002 -	Gw-	018 0	= 1-27	1-18	8
	1211			1.1.1.1	PU	RGING DA	TA.			500 20	- 22	C
with a second	1.0	17 1126	0 I		2.62e		STATIC DEP		13.78	PUBLIC PUMP THE	þρ	
WELL VOLUME PLA						EPTH TO WA	TEPS X WELL		12.78	Contraction		
janiy fil out if spi		1.1	22.02					.34	41			
EQUIPMENT VOLUE	MEPURGE 1	EQUIPHENT VO	C = PUMP V	CILLIME + (TU	BING CAPACI	TTY X	TUBERS LIENGT	H) + FLOW C	THUR VOLUME			
imiyril oatit sp	obreisie)		· 0	94 - C 8	· Mar. 0	18 "	· 0.2 =	- Ð -	25-			
COMPANY OF THE POST OF THE POS	15		HAL FORFOR		13	F-25450	ma 09.	30	deceta	035		25
AP INTER INCLUSING	VOLUME	cunia,	90.0031	the second s	2H.	Dile.	0098	IRBECU.P		TUREOTY	03108	6008
TME	Peression lighthread	PERCEP	INVER Exercise	OF	interdant Jacks	(°s)	(PAIR)	aryan mpl.	6-40 H	(hard)	(diversion)	(Harotte)
0930	-	Cational .	0.05	dest ATTOCK	-	-	-	-		-	Clark	AUNE
5935	0.25	6.25	and the second se	the second s	5.64	12.0	D-065	4.5	7 92.9	295	- inde	1
0940	0.25	0.50		_	5 49	18.0	0.062	4.9	the second se	439		
0045	0.25	0.75	0.0	_	549	18 0	0.062	5.0		435		
0945	0.25	1.00	and the second se		5.46	18.6	n 060	5.0	of the second		11	
0955	0.25	1.29	and some the state of some sta	_	5.05	17 0	0.060	-	And the Party of t	67.0	++-	
10 00	0.25	1.5			6.42	120	0.059		b 120.0	1 1 1 1 1	++-	
10 05	0.375	1,75			5.42	12.0	0.060	-	2 121.3	42.9	++-	
10 16	0.50	2.25	and the second design of the s	_		18.0	a survey of the second s		2. 122.9	and the second se	++	
10 25	0.50				and the second se	18.1	0.060	- Andrewson -	3 125.7	and the second se	++	
1035	0,50	2.7	5 0.05		5.39	19.1	0.059		2 126.2			
103.5	0120	218	2 0.03	2	0.00	18.1	0.087	15.1	- 100.0	30.0	-	~
	SA	MPLIN	GA	Hove	201	TUS	due t	e tin	re and	the lac	C	
	0	C NITU	le de	a pin	in to	and	Manne	1.	SAFA	evelop 1	de.	
	~		10000	1.4		1		· · ·		Fred 1	12	2
		ind 60	ring l	09,0	150.	6	p22	-	-	L	-	<u></u>
				1	1							
WELL CAPACITY (G TURING INSIDE DIA		2400A345660 CA	5 - 10 M S S S					5*= 1.02 0.000: 10	2012/07/07	- 5.85 5" = 0.015		
NUCLES ESTIMATION		8 - Baller;			ESP = Electric	Submersible	Penps PP =	Pedatable Pa		ver (Eposity)		
		2.00 I	id L		1	IELING DA	LA.		56P(H)		10	-
CAMPLED DY (PRINT) FAS	Nume 14	NILLS /	130	PLERIN GONAT	aux (A	in				35 ESEED AT	10	36
CEPTINES WELLINGS	13		1.00	ND CODE FE			- Phi	Pitolon Sorge	(	2 Revision		-
	· ¥	ON DESCRIPTION IN CONSISTENCY OF CONSISTENCE OF CON	PLAR Y	00	TLENG	V (Hantoont	2		KARIKANE Y	(r)		
0,007	LE é CARDAGNERT O	remover			2007	in Hannes	Diel .	- 23				APLE PSMP
MAN PROCESSING	#CATAGOR	MATERIAL CODE VI	CLIEBER (MAX)	FREEDRINKOVE		TOTAL YOL BROK MILLON		Name of Victory	HETENDED ANKUNE JACTHOD			CW RANE and are rainful
510-013	2	PE	ach -					-	PAND	AP	2	200
					1				/			
	de				- 11-12	20	-			-		
	-		-			cab.	$\times$			- 63	4	
					3		1	/	1.000			~
ХD	ne to s	ize gu	cil ibo	th wh	Nº AH	hubing	could n	6t	-no WL	daha re IRANN	cordo	d
EMARS.	J'WAL	e ow	Sempin	~~~			L MEAT	100	- An. NY	PAIAL		
NATERAL CODES		ther Claim; CO			lycethyliane;	PP = Pelype	LACH1	PIPI.	- COUDY	1 KANY		

(iii) ± 0.2 units: Tomperature: ± 0.2 °C. Specific Conductance: ± 6%. Dissolved Osppen: all readings ≤ 29% columbicative is greated; ± 0.2 mg/L or ± 10% (whichever is greater).

Revelop Date: March 14, 2016

A 1/29/18

M2032.0001

AerostarSES...

#### GROUNDWATER SAMPLING LOG

initialities installed	001	2012	100		0.00	Shew AF	8			185		
WELLING:	SHAL	104-00	3		MARTER S	MALIO	4-003-64	1-01	5 0	ma 1/28	TIR	_
			2			RGING DA					110	
Mill'F	11			lust M	NU ACREMINTS	20100100	SIATE (67	И	15 1.2	PURICE FUMPT	mpp	
WELL VOLUME P	URGE Y WE	L VOLUME = (TO	THE protects	T II		ZD a	the second se	CAPACITY	2.41-	013MU01	11	-
Servill will			0001/03555557	0.235.0022		2020 C-2003 C-200		100000	100			
			21 29	12	618	0.04	···· · 6 ·	\$ >				
EQUIPMENT VOL	UNEPURGE	DOURPHIENT VC			5445 million		TURING LENGTH	6 + FLOW	CELL VOLLAVE	-	_	
(and) fit and if	epplication		· 0	= - 10	0016 .	15 "	32F #		**			
NEDA, FIRE OR TUDE	00	F	HUN. PURP OF TH	-	15	- Post			PLM0350	REFAL VOL	-	
DEPTH N MULL BALL		12	PROVINE AND INCOME.	-		9415	anna Q*	123	EVERO AT			28
7.94	VOLUMB PERSED	volume	PUBGE	HEPTS:	201 Oriendant	(0)	citere.	DEPUL OR TO		BREASTY BUDYs	100.00	SEX09
	(prives)	PROFES	lasini	NATER	with			mpt		fund	(des tribo	(Denoted)
0925	-	-	0.053	12.61	1000	-	-	-			-	-
0430	0.27	0.27		**	15TC	17.6	0.078	5.4	2 1030	526	6.000	Bung
0935	0.27	0.54	0.053	the second s	5.24	17.7	0.071	5.7		101		
0440	0.27	0.81	0.053		5,02	17.01	the second se	5.3	Conditioners of the local data	43,3	an	Mone
0443	0.16	6.47	0.053		4.93	17.9	0.028	5.5		35.9	KLR	Non
0946	0.16	1.12	6.053	1	HAO	Contractor of the local division of the loca	0.028	5.4	the second se	31.8	an	None
0949	0.14	1.29	0,053		4.92	14.0	6.027	6,0	the second s	the second s	un	Nine
0254	0.27	1.56	0.057		5.04	19.0	0.027	5.01		26.0	an	Nom
0157	0.16	1.72	0.053		5,03	19.0	0.027	5.10		22.1	an	Name
1000	0.14	1.88	0.453		4.90	and the second se	01026	6.00		and the second se	KLA	Mane
1003	0.16	2.64	0.053	1	5.02	and the second se	6.027	5,19	the second se	14.2	un	None
1006	0,16	2.28		1	and the second se		0.026				KLR	None
1009	0.16	2.38	0.053	L			0.026	5.1			KIR	None
	1	and the second se			1121		CICLA		121.3	1.1.2		in the let
	1	19452 1946				-11 /		-	-	-	-	-
	1										-	
	-					-		1			-	-
WELL CAPACITY	Galors Per Fe	et) 0.75" = 0.02;	1*=0.06	1.35" = 0.0	61 2°=0.1	6; 3*=0.3	7; 4*=0.65; 5	P = 1.02	0'-1.47, 12'	+ 5.88	-	
TURING INSIDE D							0.004; 0/5" ~ 0		And the second se	F=0.018		
PURGING ECOIPS	KEWI CODES:	B = Baker	BP = Bladskr I	NUMA: 1	563' = Electro SAM	PLANG DA		Perist pille P	ing: 0=0th	er (Specify)		
INFLED IN PRIMIT	I wanazen	1. 1 11 /	A.c.I tents	TRES SIGNAS		1 //	n		MUK MH 1/0	10 MARDING	1	2
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SPTH WULdert	15	·		AL GODE PC	V	200	5A	Filia like Denter	sent Tape	H thribe		1.00
	The second s	O EXAMPLICATION:	PUMP Y	(HZ)		1 Constant			WINDOWE V	G.		
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100001100000	PC-8116-895	INCERNAL CODE VO	WHEE PHE	RESERVATIVE		NUTHL VOL		Accert Patho	METHOD MALANE	AANDE SAMPLISGE	STRANSING U	be, support
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1250(511)					101-002-0 <b>7</b> 0		en/1-11171900		000000000000000000000000000000000000000	N 1000 N 1000	2011/10/05	
ATERML CODES	AG = Ar	iber Gent; CG	- Chan Ghan	PE = Dot	athidese	PP = Dates	opytene: 8 + 100c	T-	Teles and	an Alberta A	_	_
AMPLING EQUIP		APP = Alter Pr	elstati i Purp:	45 = 6	Aut: DP -	Theddar Pum	tt. ESP = Elect	ing Submerry	State Parent	an Andread (	-	
		REPP = Rave	198 Filley Perista	St. Politiq	ISM + Shraw	r Method (Tul	sing Gravity Dreinic	0 = 08	her (Spacity)			

pri: ±0.2 units Temperature; ±0.2 °C Specific Conductance; ± this Disactived Davgen: elirendings ± 20% saturation; optionally, ± 0.2 mpl, or ± 10% (whichever is presser). Turb)dity: elirendings ± 20 MTL2 aplitentity ± 1 NTU, or ± 10% (whichever is greater).

Revision Gets: March 54, 2016

c-52 1/29/18

M2032.0001

AerostarSES.,

#### GROUNDWATER SAMPLING LOG

The North Balance         Vielance         ATTR         The North Mark         Provide Mark         Other         Other Mark         Other M	vetificias: Ballas at	or investor					24	6 Belling 1911-2	177 Jun 1	(		_					1
Mile         Data         Mile         Disk         Disk <thdisk< th="">         Disk         Disk         <thd< td=""><td>VICILIAN BRANCE-OP</td><td>6</td><td></td><td></td><td></td><td></td><td>DAMPLICAL</td><td></td><td></td><td></td><td></td><td>-</td><td></td><td>ATE.</td><td>1/</td><td>30/201</td><td>8</td></thd<></thdisk<>	VICILIAN BRANCE-OP	6					DAMPLICAL					-		ATE.	1/	30/201	8
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DEPENDENTIAL GAO         DEPENDENTIAL GAO         DETENTI D/C         PARENTIAL GAO           TO         VOLUNE BARROT B			1 EQUIPMEN			100001242						GR.L.V					
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TWO         Partial         THE	5		10 02888	L F	3048	007411		(6)(0)			100000000	511	089		URIDITY	COLON	2008
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WELL CAPACITY (Delines Per Fool):         0.19*+0.002;         1*-0.04         1.25*+0.00;         2*-0.30;         3*-0.05;         5*=1.02;         6*=1.47;         1.2*+0.04           NELL CAPACITY (Delines Per Fool):         0.19*+0.0014;         1.25*+0.002;         1*1*+0.0116;         55*+0.005;         1.2*+0.016;         555*+0.006;         555*+0.006;         1.2*+0.016;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         55		<u> </u>							-	_	1	_		-		-	<u> </u>
NELL CAPACITY (Delines Per Ford: 0.15" + 0.02; 1'+0.04/ 1.25" +0.05         2'+0.30; 2'+0.02; 3'+0.055; 5'+1.02; 6'+1.47; 1.2"+0.04           NELL CAPACITY (Delines Per Ford: 0.15" + 0.024/ 1.25" +0.00; 2'+0.02; 0'+0.055; 5'+1.02; 6'+1.47; 1.2"+0.04; 0:55* +0.046         Statistic Data           NELL CAPACITY (Delines Per Ford: 0.15" + 0.024/ 1.25" +0.00; 2'+0.02; 0'+0.045; 0'+0.046; 0:55* +0.046; 0:5*		-	-		-		-		-	- /	<u> </u>			-		-	-
WELL CAPACITY (Dallana Par Fool):         0.19" + 0.02;         1" - 0.04         1.25" / 0.05         2" - 0.30;         7" - 0.05;         5" - 1.02;         6" - 1.47;         1.2" + 0.04           NUELL CAPACITY (Dallana Par Fool):         0.19" + 0.014;         1.25" / 0.05;         2" - 0.30;         3.15" + 0.05;         5" - 1.02;         6" - 1.47;         1.2" + 0.04;           TURING INSDE DIA, CAPACITY (Dallana Par Fool):         0.19" + 0.014;         1.4" + 0.05;         2" - 0.05;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.0		<u> </u>		-	-						<u> </u>	_		<u> </u>		+	<u> </u>
WELL CAPACITY (Dallana Par Fool):         0.19" + 0.02;         1" - 0.04         1.25" / 0.05         2" - 0.30;         7" - 0.05;         5" - 1.02;         6" - 1.47;         1.2" + 0.04           NUELL CAPACITY (Dallana Par Fool):         0.19" + 0.014;         1.25" / 0.05;         2" - 0.30;         3.15" + 0.05;         5" - 1.02;         6" - 1.47;         1.2" + 0.04;           TURING INSDE DIA, CAPACITY (Dallana Par Fool):         0.19" + 0.014;         1.4" + 0.05;         2" - 0.05;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.0		-	-	-	1		-	-		1	-		-	-		-	-
WELL CAPACITY (Delines Per Fool):         0.19*+0.002;         1*-0.04         1.25*+0.00;         2*-0.30;         3*-0.05;         5*=1.02;         6*=1.47;         1.2*+0.04           NELL CAPACITY (Delines Per Fool):         0.19*+0.0014;         1.25*+0.002;         1*1*+0.0116;         55*+0.005;         1.2*+0.016;         555*+0.006;         555*+0.006;         1.2*+0.016;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         55		-	<u> </u>		1				1		<u> </u>		-	-			
WELL CAPACITY (Delines Per Fool):         0.19*+0.002;         1*-0.04         1.25*+0.00;         2*-0.30;         3*-0.05;         5*=1.02;         6*=1.47;         1.2*+0.04           NELL CAPACITY (Delines Per Fool):         0.19*+0.0014;         1.25*+0.002;         1*1*+0.0116;         55*+0.005;         1.2*+0.016;         555*+0.006;         555*+0.006;         1.2*+0.016;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         55		-		-	_	1	-		K_		-			_		-	-
WELL CAPACITY (Delines Per Fool):         0.19*+0.002;         1*-0.04         1.25*+0.00;         2*-0.30;         3*-0.05;         5*=1.02;         6*=1.47;         1.2*+0.04           NELL CAPACITY (Delines Per Fool):         0.19*+0.0014;         1.25*+0.002;         1*1*+0.0116;         55*+0.005;         1.2*+0.016;         555*+0.006;         555*+0.006;         1.2*+0.016;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         555*+0.006;         55					_	1		-/	<u> </u>		<u> </u>	_		<u> </u>		-	
WELL CAPACITY (Dallana Par Fool):         0.19" + 0.02;         1" - 0.04         1.25" / 0.05         2" - 0.30;         7" - 0.05;         5" - 1.02;         6" - 1.47;         1.2" + 0.04           NUELL CAPACITY (Dallana Par Fool):         0.19" + 0.014;         1.25" / 0.05;         2" - 0.30;         3.15" + 0.05;         5" - 1.02;         6" - 1.47;         1.2" + 0.04;           TURING INSDE DIA, CAPACITY (Dallana Par Fool):         0.19" + 0.014;         1.4" + 0.05;         2" - 0.05;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         1.2" + 0.01;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.006;         5.45" + 0.0		-			_		14	1/	<u> </u>		-	- 93		<u> </u>		-	-
TLEERING INSIDE DIA, CAPACITY (Salarity, UK* = 0.0006; M/* = 0.		-			_	-/	XA	K /			<u> </u>			<u> </u>		-	-
TLEERING INSIDE DIA, CAPACITY (Salarity, UK* = 0.0006; M/* = 0.		-		-	-	1	1	$\sim$	-					-		-	
TLBBING INSIDE DIA, CAPACITY (34//12)         UP = 0.0006;         M/ = 0.0006;					-	· /	1/3		_		1						
	TURING INSIDE DU	CAPACITY (	Galuppic Us	- 0.0000:	when	+0.0014:/	147 - 8.48 887 - Basis	a Buttehonikle	0.004 Punyt	5/57 = 6	1006 1	UT = 0.	010 5.9		ið ofy)	_	
NAME OF TRANSPORT	28-22 C	09235				1/		NUNGRA	TA		-	MUN	AM.	_	Lawrence 1		
Seriel Science         Million Code FX         Million Cod	0.01000000	PELVIDG4			-		21022		1	_		NIDAT	ID AY:		ENCRO AT		
HELD DOCORTINANTITIE         POART         Y         H         TURKS         Y         HOMENANT         Organization					100 C				1					N.	1101.318		811
	an an an and the d	PAGU	OCCUTANIAN	THE POW	_		TLENS	V Noghoad	0.	1	Case of Carls	-		Ň			_
Selfatione sources remaining remaini	LAN	and the second se	the state of the s	1			Conception in state in state	the second s		1		-				1	AFUE PUBP
	Second to Capit	903636681	weak.cog	VILLAWE (SIL)	, ¥					nan yaa	adara	NUDA		ANDER			peratival)
			/								1	1	EPA STA	i i			
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		1	1.1.1.1	12.2.110	-		-		-	_	- 22	-	-/			-	
	nimetro						_							1			
MATERIAL CODES: AG = Araber Class, CB = Clear Glass, PE = Polyatilylana, PP = Polyacopylana; 5 = Elicona; T = Tarlan; O = Other (Specify)														tar (Spe	/ Me		
SAMPLING EQUIPMENT CODES: APP - After Pertitable Pump; B - Date: BP - Bladder Pump; ESP - Electric Submercible Pump; RFPP = Revenue Play Peristable Pump; BM - Staw Method (Tubing Gravity Drain); 0 - Other (Baedly)	SAMPLING EQUIPA	ent cones:													1		

pH ± 0.2 units Temperatures ± 0.2 °C. Barcillic Conductances: ± 5%. Dissolved Oxygen: all readings ± 20% subantlys; ± 0.2 mpl, tv ± 10% (objectives is greater) Tabletty: all masters ± 25 NTU: optimally ± 5 NTU or ± 10% (objectives is greater)

Revision Date: March 14, 2016

Aerostar SES...

#### GROUNDWATER SAMPLING LOG

NUMBER PROPERTING         NOTICe 0.0016         NOTI	Valvine 162002.000	H	_				26	Shaw AFI	B						-
PURENCE DATA           Note: Twell of the second service serv	ALL NO SHAL	Vos-1	500			1.9	ueren S	HAWO	15-0	02-61	1-0	33 WE	1/27	118	
Martin Roman         Sector Bundary         Y Starting         Starting         Protect Bundary								the second second second second			-	-		1 - E -	_
Weblick         Control         Product         Product <t< th=""><th></th><th>1''</th><th></th><th>NEMO</th><th>31</th><th>16 3</th><th></th><th></th><th></th><th></th><th>31.9</th><th>31)</th><th></th><th>"C</th><th>L.</th></t<>		1''		NEMO	31	16 3					31.9	31)		"C	L.
Internation         International         Internaternation         Internation         Internati	the second s	ROL 1 WEL					and the second second second				-		for more	Seco.	•
Initial conditional     Initial init				10 ·											
DOT/SHAVELUL         Descriptions         Descriptions         Descriptions           11XX         Volume 1 general sector         11XX         11XXX         11XX         11XXX			1 EQUIPMEN								W CHILL				
TOX         OSSIET NUMBER         OWNER NUMBER         PARK NUMBER         PARK TO TOX NUMBER         PARK TOX NUMBER	and the second sec	8								a constant	-	1 State 2 Stat			
THE         PRODUCT         VALUE         KET         TO         PRODUCT         CO         PROD         COURSE         COURSE <t< td=""><td></td><td>VELOP</td><td>0.99</td><td>the second s</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>et in a</td><td></td><td></td><td></td><td>0001</td></t<>		VELOP	0.99	the second s		-					et in a				0001
************************************	1696	11.000.000	Heat	0	- O 1291-1	wares		ŕø	plan			(mil)	(8756)	(inerd)	d stream
************************************		0.00	1 1	Dad	to	de	6+4	ofu	a te	CIAN	hick			1	1
Hors will be as scale See off.           See Soft Street.				sxr.	45	Ptt	-sta			11:44 5			/	1	1
NELL CAMACITY (Stellans Prefrance)         OFFEn DATE         OFFEN DATE<			1			1.6					1728				
WELL CAMACITY (Subtration Pres Face):         1/2					~	00	6 4		V		-				
NUMBED ON         CARACTLY (Data/TL):         VET = 0.0000;         319" = 0.0010;         VET = 0.0010;         VET = 0.010;         VET =				T	1	3	-							-	1
NUMBED ON         CARACTLY (Data/TL):         VET = 0.0000;         319" = 0.0010;         VET = 0.0010;         VET = 0.010;         VET =				-	-	~				-	-			+	-
NUMBED         CARMACITY (Gal./TL):         VET = 0.0005         31%* = 0.018         AVE* = 0.018         VE* = 0.010         56%* = 0.018           PL/PORTE FQUERMENT CODES:         B = Ballac:         R* = Balac:         R* = Ballac:         R* = Ballac:				-	-				-	_				-	-
NUMBED         CARMACITY (Gal./TL):         VET = 0.0005         31%* = 0.018         AVE* = 0.018         VE* = 0.010         56%* = 0.018           PL/PORTE FQUERMENT CODES:         B = Ballac:         R* = Balac:         R* = Ballac:         R* = Ballac:				-		/	-		-	-	-			-	
NUMBED         CARMACITY (Gal./TL):         VET = 0.0005         31%* = 0.018         AVE* = 0.018         VE* = 0.010         56%* = 0.018           PL/PORTE FQUERMENT CODES:         B = Ballac:         R* = Balac:         R* = Ballac:         R* = Ballac:			-	-	/			~							
NUMBED         CARMACITY (Gal./TL):         VET = 0.0005         31%* = 0.018         AVE* = 0.018         VE* = 0.010         56%* = 0.018           PL/PORTE FQUERMENT CODES:         B = Ballac:         R* = Balac:         R* = Ballac:         R* = Ballac:			-	1		-	-							+	-
NUMBED DAY, CARVACITY (Daulity): 147 = 0.0005; 3197 = 0.0014; 147 = 0.0025; 5197 = 0.014; 147 = 0.000; 127 = 0.010; 147 = 0.000; 127 = 0.010; 548 = 0.018           PLICENSI EQUIPMENT CODES:         B = Ballac; (P = Blackin Phang); EEP = Electric Submanishie Phang; 197 = Pasteletic Phang; 0 = Other (Epecily)           Status			1	-		-	-		-					-	-
NUMBED         CARMACITY (Gal./TL):         VET = 0.0005         31%* = 0.018         AVE* = 0.018         VE* = 0.010         56%* = 0.018           PL/PORTE FQUERMENT CODES:         B = Ballac:         R* = Balac:         R* = Ballac:         R* = Ballac:				-	-	-	-			1	_				+
NUMBED ON         CARACTLY (Data/TL):         VET = 0.0000;         319" = 0.0010;         VET = 0.0010;         VET = 0.010;         VET =			1		-	-	-		-		~			-	-
NUMBED ON         CARACTLY (Data/TL):         VET = 0.0000;         319" = 0.0010;         VET = 0.0010;         VET = 0.010;         VET =					_	-	-							-	+
NUMBED ON         CARACTLY (Data/TL):         VET = 0.0000;         319" = 0.0010;         VET = 0.0010;         VET = 0.010;         VET =	-6-		-	-	_		-	-		-	- 23			-	-
NUMBED         CARMACITY (Gal./TL):         VET = 0.0005         31%* = 0.018         AVE* = 0.018         VE* = 0.010         56%* = 0.018           PL/PORTE FQUERMENT CODES:         B = Ballac:         R* = Balac:         R* = Ballac:         R* = Ballac:	<u> </u>									_				1	-
NUMBED         CARMACITY (Gal./TL):         VET = 0.0005         31%* = 0.018         AVE* = 0.018         VE* = 0.010         56%* = 0.018           PL/PORTE FQUERMENT CODES:         B = Ballac:         R* = Balac:         R* = Ballac:         R* = Ballac:				_		-				-			22		1
NUMBED         CARMACITY (Gal./TL):         VET = 0.0005         31%* = 0.018         AVE* = 0.018         VE* = 0.010         56%* = 0.018           PL/PORTE FQUERMENT CODES:         B = Ballac:         R* = Balac:         R* = Ballac:         R* = Ballac:		$i = \lambda_i$						4		12				1	1
AMPLADER PROTI MERADICA AMPLADER PROTI MERADICA SUBJECT CONTINUES ACCOUNTS AND ADDRESS ACCOUNTS ADDRESS	UBING MODE DW	CAPWORTY (	anna w		3192*	= D,0014;	1/4" = 0.003 ESP = Electri	o Submenible	2,004; 0 Pump;	W0" = 0.000;	1/2*>0	010: 5/8*=	0.018	_	
Sourcesson         Sources							S48	MPLING DV	TA		-		hower	_	
SEPHINIANELI (See)	APLACES PROTO IN	PAMICS			CANPL	DRIVE IN SAME	URKINE								
DECK/02000/04/04/04/00/0         MARK         N EXEMPLY			2.2	40 T	100000					10,0.0,7200	0-	۷	Film Size	9	-
AMPLE CONTINUE ENVIREENTIAL OMPLE DOOD VERSION AND ADDRESS AND AD	PhileWill Ind			-	_					Filentier 2g	A Designation of the local diversion of the local diversion of the local diversion of the local diversion of the	and the second se	o		-
MREDOOR ROBBERS WILLIAGE VOIRLESS VOIRLESS VOIRLESS VOIRLESS VOIR 100 AROUNT	ME		the second s	1011 PU	1	-	the second se	a particular in the later of the later		_	DUPSE	With T		-	AMPLE FORM
			T	VOIR UE 14	4) P		X	ATTA WEL		N. pH (Rimard Gol)				COPINIC .	
				2.1		/		1	$\nabla$		1	EPA SITM	1.1.2		
				1	-	_	-			-	-		-		
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		-/-	<u> </u>		+		-		-	_	-	-		-	_
					_				_			-	1	_	
WANDON	wepa													~	
MATERIAL CODES: AB = Ander (Bass; CG = Class; CB = Polyellylene; PP = Polyeropylene; S = Silcone; T = Toflox; O = Other (Specify)	TERML CODES:	A = A	yber Blans;	CG - Ckm	Gins;	PE + Pe	haitylana;	pp = Polype	opylena; S	i = Silcone; 1	Te Toffor	c 0=0he	(Bpeolly)		
SAMPLIND EQUIPMENT CODES: APP = Aller Personic Pump; 8 = Baller; 8P = Blacker Pump; ESP = Biccitic Submarize Pump; RFPP = Bevalue Pow Personic Pump; 58 = Since Mathed (Tubing Crunity Drain); 0 = Other (Specify)	and the second se		APP ~ AP	ler Pertelok	ic Pump;	8=8	slor; BP:	- Radder Put	WX ESP	= Electric Subst	astia P	1/10/	a free des		

Barriston Cale: March 14, 2016

M2032.0001

C-54 AV 1/27/19

7/12/18



GROUNDWATER SAMPLING LOG

PROJEC				1.2200		INSTALLATIO	21	MIN A	trinking in the second			cer.5
WELL NO	r shawoi	5-003		SAMPL		19W05-0		- culo	32	DATE: DI	18/18	_
Luna		. I more			and the second second	RGING D	Company of Company		100	na line		
	R (Inches): 1	TUEN DIAM	ETER (inches):	14 0DE	PTH 35.10	Feet to 25.10	foot To		R (feet): 29 -	CR B	E PUMP TYP	PP
(only fill o EQUIPM	LUME PURGE: ut if applicable) INT VOLUME P ut if applicable)	1 WELL VO	2LUME = (TOT = ( 3	rat, Well, De (ちょ) し = PUMP VC	fest - 2 XUME + (1	28.38 UBING CAPA	te STTY 3	eet) X X TL	JBING LENGTH	gallona/foot ) + FLOW CEL	VOLUME	
DESCTI AL D	UNIC OD VIDIN		T market mark	Advantation of the state of the	gellons + (	000 00	Ions.Root )		PURGING	1	gallons =	galions
	UMP OR TURIN WELL (feet):	° 32		WELL (Rent):		- WELL	SULT AT	MI: O	ENDED AT:	1353	TOTAL VOLUI PURGED (gail	ons):
TIME	VOLUME PURGED (seliona)	CLIMUL VOLUME PURGED (gelicins)		DEPTH TO WATER (feet)	tstandan (standar) (stina	d TEMP.	cot torde ambo	(ation	DISSOLVED OXYGEN (dote units) mail_ar % Estimation	TURBIDITY (NTUs)	082 (mV)	COLOR/ COLOR (desorbs)
1322	0	0	0.066	28.38	-	2001	-					
1326	0.26	0.26		×	5.45	20.2	6.07	4	4.45	459	119.5	none/0
132	0.20			1	5.43	20.6	0.0		4.27	50.5	1277	nonelo
1332	0.30		1		5.32		0.0	1.1.0	4.25	21.7	130.Z	none/c
1335	0.20				5.22		D.C	10000	4.5T	13.0	139.6	T
1338	0.20				5.20		0.0		4.72	8.89	140.2	
1341	0.20			11	5.10	21.3	0.0		5.07	10.2	144.7	
1344	0.20				5.09		0.0	_	5,30	11.4	146.2	
1347	0.20			11	5.09		0.0		4,55	6.84	144.2	
1350	0.0				5.11	21.3	0.0	and the second se	4,56	10.2	144.0	
1353			1	1	5.09		0.0		4.71	5.31	143.9	4 4
	PACITY (Gallon NSIDE DIA, CAI			1"=0.04;	1.25" = 0			= 0.37; 16 <sup></sup> = 0.0		5* = 1.02; 6		* = 5.88 * = 0.016
	EQUIPMENT (			BP = Bladder		ESP = Electri				elistatic Pump;	Contraction of the second second	r (Specily)
					and the second second	PLING D	and a second	11.14				
	K (ASL		in (ASL	SAMPLER(S	I) SIGNATU Na	Klar	~		SAMPLING INITIATED AT	1354	SAMPLING ENDED AT:	13.58
PUMP DR	TUBING	2'	2	TUDING	PE	η <i>ρ</i>			FILTERED: Y	(N)	FILTER SIZE	µm
	WELL (feet): CONTAMINATIO	DIK: PUI	NP Y (N	MATERIAL	TUBING	V Gi	replaced		DUPLICATE:	pe; Y	GD -	
	PLE CONTAINE			1	NAME OF T	PRESERVATI		-	INTENDE	-		AMPLE PUMP
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVA	TIVE	TOTAL VOL	F	PINAL pH	ANALYSIS A	D EQU	ODE (r	FLOW RATE
093-604-	2	PE	250 each	N/A		N/A	N	I/A	537 m	1	9Pp	250
				-	-		-			-	-	
					10	9		-	1		-	
-					1		_		-			
REMARK	i × pue 1	no well s	ize, both	water lev	el anto	e and his	ins com	-lol n	+ Gt man	ue onthe	Ve Canded	darian
	CL SAR			Clear Glass;		siyethylenec			intet; 8 = Silico	-		r (Spedfy)
1 MAATCORA		ALL THAT ALL ALL	LODGER, LILE P.	LOUMI 1918/88;	- PE = PC	ACCRETE FOR THE PARTY OF THE PA	- PP - PU	0.04001316		I - I - I - I - I - I - I - I - I -	<ol> <li>D.H.D.D.B.</li> </ol>	CODECITY 1

70 1/29/18

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C-55

Aerostar SES...

GROUNDWATER SAMPLING LOG

WELL	1.0	T/MI	80 LZ	0.0	429		TA 24.84	N	-7 67	PURKERUMP 7	mt A/	6
menterrisi enderaja	1.0	380	======================================	00 3	1. KY	17 "	TO WATLAND	alteration of the lateral	27.97	CR BALLER	The pp	21
WELL VOLUME PI							안감가 집안가 걸	CAPACITY				
inty O safety	ppfowhe		34.84	n .27	A7	0.04	14h - 05	27	21			
COMPACTORING								2000	-			_
EQUIPMENT VOLI (wath with		NA		38 = 1	BING CAPAC	88.22 C - 60 U	TURING LENGT	s+PLOW(	PHIL WOLUME PH			
Serial POLIP ST 1000	* 31		FRACE FOR PORT		1	PLBC	1448		ALTA GROUP	IL I TOTA VOL		2
and and an an a second	WICHME	CLMRL.	FUNDE	Larni.	10	TEMP.	FCHID.	3591013		TURE DITY	asias	-
TRAD	ANNOUS CONTRACTOR	100.0564	AA1E	/10	introducti entro	19	pitting.	cent		0,000	Feetbe	-
in de	-	PUVDED	far6	WATER BUILD	1.112.2	-		righ	_		-	
14.88	-	-	0,066	27A7	-	-	-	-			-	-
1421	0.20	0,20		**	5.36	20,0	0.048	38	7 523	282	1290	No
1424	6,20	0.40			5.22	20,3	0,046	4.02	62.8	125	510	No
1429	0.33	0.73	10.06		5.08	20.7	0.042	4,86	87.2	18.7	an	
1432	6.20	0,97	10,046		5.00	20.7	0.041	5.10	14.8	140	an	
1435	6,20	1.12	0,066		4,98	20.7	0,041	4.77		5.48	in	
1438	0.20	1.32	6.066		4.95	20,6	0,040	4,82	and the second se	3,09	al	
1441	6.20	452	6.046		4.42	20.7	0,040	4,4:		2.65	wi	W.
	1	1.1.1		-			-10.10		- Hor	2.07	1940	14
	1		-			-	t				-	-
	1		-	1	1						-	100
	1		-		40	-					-	+
			-	-	1-			-			-	-
	-	-		-		<u>e</u> ;		-			-	-
~	-										-	-
	-		-	-		-					-	-
									_		-	_
	1			1000	5						1	
WELL CAPINCITY () TUBING INSIDE OF		She have	1. Sec. 10. 00			8. THURSON	7; 4*=0.66; ( 0.004; 3/6*=0	6**102	1911 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- 0.010		
		B = Bailor,	EP = Blobbs			: Subewerxible		Partstalkic Pi	the second se	c (Specify)		_
PURGING EQUIPM				100	SAN	ELING D	TA				-	
		V. V/1	HSL MUR	REAL SOLUTION	mas /	1.11.	W-		NEWTERN J44	Z avanyuses	Mala	6
	errouse 7	VALANTE	the second s	1	1	1	1	O-FILTERED.	y C	the second s	and the second second	and.
PURCING EQUIPM INSPECT (MINISTA PURPOR LANS		VijnK/F	11/10/14				100			-		_
PUNCING EQUIPM	31		ANTER .	BAL CODE HE	20			ritaine Dater		$(\overline{a})$	-	
PURCING ECCIPM SAURUS IN (MINIT) A FUND OF TUBINE TRATE IN THE ALL PARE	31	occontormotor	ANTER .	941.000E HE		Y CHING	>	ettenne Toplar	denuidare y	4		
PLANCING ECCUPAN Interaction of Antonio PLAP OF TLANS (CAPTE IN MILL, page (INVERSION)	31	occontormotor	990153 95509 Y (	D	54,6	PLE FREIGERMI	>	fillinder Engelger	DEPUDATE Y	UCCOR AMAGANA	CLEMENT F	LINEV NOT
PURCING ECCIPM SAURUS IN (MINIT) A FUND OF TUBINE TRATE IN THE ALL PARE	31	occontormotor	7556 Y (	the statements	548	and the second se	2004 2004		DENIGATE Y	1	CLEMENT F	LIEV NR
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Revision Dote: March 14, 2015

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#### GROUNDWATER SAMPLING LOG

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GW-033 & PE Gach APF 200 4 PE Gach APF 200 4 PLue to size of well, both WLM and tubi-j wild not fit - no will down to condent awake during GW Sampling. HATERBALCOOLES: AB-Anter Glass; CO-Ober Glass; PE-Polyophylene; PP-Polyophylene; B-Blezne, T-Tuber O-Ober (Spechyl		a costasera	MODIA.com		"				0	THM. (HID	emend Unitsä			Parameter			(er altebi
4 Rue to size of well, both WLAM and tubing would not fit - no which defaure condent outware during but Sampling. HATERIAL CODES: AB-Anter Glass; CO-Ober Glass; PE-Polyathylene; PP-Polyathylene; 8-Blasse; T-Tubar O-Ober Specify		2	PE	each	-	-	-					1.3	EPA 639M		AP	2	206
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	the second se	and the second se	and the second second second											er (Spec	έş]	_	-
SAMPLING EQUIPMENT CODES: APP + Alter Paristal's Punys; B + Italiar; BP + Bacter Puny; BSP + Bitch's Subsectible Puny; BEPP = Revenue Flow Paristalia Punys; SH = Straw Method (Tubing Gravity Oralo); O + Other (Specify)	SAMPLING EQUIPS	ENT CODES:															

pH: ± 0.3 units Temperature: ± 0.3 °C. Specific Conductance: ± 5%. Dissolved Oxygen: # Inactings ≤ 20% source/bre, optionally, ± 0.2 mpt, or ± 10% (whichever is greater). Turkidity: all readings ≤ 20 MTU; optionally ± 6 MTU or ± 10% (whichever is greater).

Resiston Date: Manth 14, 2016

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GROUNDWATER SAMPLING LOG

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ASL         Inversingly science.areas         SAMSH_ING_DATA           TOM:         J. U.e. and C. ASL         Inversingly science.areas         SAMSH_ING_DATA           TOM:         J. U.e. and C. ASL         Inversingly science.areas         SAMSH_ING_DATA           TOM:         J. U.e. and C. ASL         Inversingly science.areas         Samsh_ING_DATA           TOM:         J. U.e. and C. ASL         Inversingly science.areas         Samsh_ING_DATA           TOM:         Samsh_ING_DATA         TOM:         Tom:         Tom:         Samsh_ING_DATA           TOM:         Samsh_ING_DATA         Tom:         Tom:         Tom:         Tom:         Tom:           TOM: <td>CODES:         B = Badder Parez;         ESP = Elactic Submender Parez;         PP = F           SAMPLING DATA         SAMPLING DATA         SAMPLING DATA           Text         J. U. L. M. (A.L.)         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J. M. L. P. States Paris; PARIS Tables</td> <td>CODES: 3 = Baller; BP = Badder Pares; ESP = Elactic Submanities Pures; PP = Periodic Pures; O = Other (Specify SAMPLING DOTA Tent J. U. J. H. A. A. International Science Pares; ISP = Elactic Submanities Pures; PP = Periodic Pure; O = Other (Specify SAMPLING DOTA Tent J. U. J. H. A. A. International Science Pares; ISP = Elactic Submanities Pure; PP = Periodic Pure; IH &amp; W International Pur</td> <td>CODES: B = Baller, BP = Balder Party; ESP = Electric Submerridie Purty; PP = Petristatio Purty; O = Other Statesty) SAMPLING DOTA Term J. U. J. ALC ASL INATURE, solecturarys; Term J. U. J. ALC ASL INATURE; TERM J. U. J. ALC ASL INATURE; TERM J. U. J. ALC ASL INATURE; TERM J. U. J. TRANS INTERCOMMENT INATURE; TERM J. U. J. TRANS INTERCOMMENT INATURE; TERM J. U. J. TRANS INTERCOMMENT INATURE; TERM J. /td> <td>CODES: 3 - Baller; BP - Badder Pares; ESP - Electric Submerselles Pares; PP - Petristatic Pares; O - Other (Specify) SAMPLING DOTA Tent J. U. J. ALL ASL TOME J. U. J. ALL ASL TOMES</td>	CODES:         B = Badder Parez;         ESP = Elactic Submender Parez;         PP = F           SAMPLING DATA         SAMPLING DATA         SAMPLING DATA           Text         J. U. L. M. (A.L.)         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States Paris; PARIS Tables	CODES: 3 = Baller; BP = Badder Pares; ESP = Elactic Submanities Pures; PP = Periodic Pures; O = Other (Specify SAMPLING DOTA Tent J. U. J. H. A. A. International Science Pares; ISP = Elactic Submanities Pures; PP = Periodic Pure; O = Other (Specify SAMPLING DOTA Tent J. U. J. H. A. A. International Science Pares; ISP = Elactic Submanities Pure; PP = Periodic Pure; IH & W International Pur	CODES: B = Baller, BP = Balder Party; ESP = Electric Submerridie Purty; PP = Petristatio Purty; O = Other Statesty) SAMPLING DOTA Term J. U. J. ALC ASL INATURE, solecturarys; Term J. U. J. ALC ASL INATURE; TERM J. U. J. ALC ASL INATURE; TERM J. U. J. ALC ASL INATURE; TERM J. U. J. TRANS INTERCOMMENT INATURE; TERM J. U. J. TRANS INTERCOMMENT INATURE; TERM J. U. J. TRANS INTERCOMMENT INATURE; TERM J.	CODES: 3 - Baller; BP - Badder Pares; ESP - Electric Submerselles Pares; PP - Petristatic Pares; O - Other (Specify) SAMPLING DOTA Tent J. U. J. ALL ASL TOME J. U. J. ALL ASL TOMES

% ± 0.7 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Disselved Oxygen: all readings ≤ 20% saturator; optionally, ± 0.2 ropt, ur ± 10% (whichever is genuine) Turbicity; at readings ≤ 20 NTL; optionally ± 6 NTU or ± 10% (whichever is genuine)

Havitsion Date: Wenth 14, 2010

C-58

Q 1/27/18 7/12/18

Aerostar SES\_

#### GROUNDWATER SAMPLING LOG

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Y C		nteer Chera;		QMHH.	PE = Paly 8 = Del	ediylens;	PP = Polypeo Recting Pury	pyłena;	8 = Silo		feflori;	0 = C()				

pH: ± 0.2 un3s. Temperature: ± 0.2 °C. Specific Conductance: ± 0%. Directived Coyger: all markings ± 20% seturation; epitomaly; ± 0.2 mg/L or ± 10% (which seer is greater). Turbidity: all readings < 20 NTU; optionaly ± 5 NTU or ± 10% (which seer is greater).

Revision Dele: Wards 14, 2010

C-59 P 1/27/18

# SEDIMENT / SURFACE WATER / GROUNDWATER (GRAB)

ano in Germania at apply): C	HAWOH - 004	Surface V	/ater		Groundw	otor
7-18 15 at FTA 5 CAINING PLAN at apply): ( one): C	6 Sediment	Surface V	/ater		Groundw	otor
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at FTA 5 CAINING PLAN at apply): ( one): C	6 Sediment	Surface V	/ater		Groundw	otor
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at apply): <	Sediment		Vater	1	Groundw	otor
one): C	hannel/Ditch					0.01
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	SEDIMENT SA				Outor .	
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noon		Analysis/Method:				hand a chiral a chira
948-1933 - MARA		Preservative:		20.00		
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0.51	C	ollection Method;	Gr	4B		
	121100 AL658	: 이 10 8.44.8 2 2.4 2 2 4 -			Contraction of the second s	
NONE	Water Qu	ality (circle one):	Clear	Cloudy	Turbid	Other
GRO	UNDWATER SAN	IPLE (GRAB)				
	Sample	Collection Time:				
		Meton Method				
EPA 537M						
NONE	Water Qu	ality (circle one):	Clear	Cloudy	Turbid	_Other
	0.5' 50mL PF 50mL PF 8 04-004-5W-901 0.5' EPA 537M NONE GRO EPA 537M	O.5'         Sedir           SOML         PC           SURFACE WATER         Surface water           OU-004-SW-901         MGM SMS9           OU-004-SW-901         MGM SMS9           O.5'         Co           EPA 537M         Sa           NONE         Water Qu           GROUNDWATER SAM         Sample           CROUNDWATER SAM         Sample           EPA 537M         Sa	0.5'     Sediment Description:       50 mL     Preservative:       SURFACE WATER SAMPLE       OUT-00 4-5 W - 90 1 MG/M S/MSP       Sample Collection Time:       0.5'     Collection Method;       0.5'     Collection Method;       EPA 537M     Sample Container;       NONE     Water Quality (circle one);       GROUNDWATER SAMPLE (GRAB)       Sample Collection Time:       Colspan="2">Collection Time:       Sample Collection Time:       Colspan="2">Collection Time:       Sample Collection Time:       Colspan="2">Collection Time:       Colspan="2">Collection Time:       Colspan="2">Colspan="2">Colspan="2">Collection Time:       Colspan= 2	0.5'       Sediment Description:       Sand         Some       Preservative:       Preservative:         SURFACE WATER SAMPLE       Preservative:       10.5         SURFACE WATER SAMPLE       Out-out-SW-901 WSMS/639       Sample Collection Time:       10.5         0.5'       Collection Method;       C.e         EPA 537M       Sample Container:       7.1         NONE       Water Quality (circle one):       Clear         GROUNDWATER SAMPLE (GRAB)       Collection Time:       Collection Time:         EPA 537M       Sample Collection Time:       Clear         EPA 537M       Sample Collection Time:       Clear         EPA 537M       Sample Collection Time:       EPA 537M	O.S'       Sediment Description:       Sandy Sill         SomL PC       Analysia/Method:       EPA         SURFACE WATER SAMPLE       NO         SURFACE WATER SAMPLE       1055         0.5'       Collection Time:       1055         0.5'       Collection Method:       GRAM         EPA 537M       Sample Collection Time:       1055         NONE       Water Quality (circle one):       Clear       Cloudy         GROUNDWATER SAMPLE (GRAB)       Sample Collection Time:       Clear       Cloudy         EPA 537M       Sample Collection Time:       Clear       Cloudy         Bample Collection Time:       Sample Collection Time:       EPA 537M       Sample Collection Time:         EPA 537M       Sample Collection Time:       EPA 537M       Sample Collection Time:       EPA 537M	O.S'       Sediment Description:       Sandy Silt w/orgo         von       Analysia/Method:       EPA 537M         SturFACE WATER SAMPLE       NONE         out-out-swide       NONE         SurFACE WATER SAMPLE       10655         out-out-swide       Sample Collection Time:         Surface water sample Collection Time:       10655         out-swide       Sample Collection Time:         Surface water Quality (circle one):       Clear       Cloudy       Turbld         GROUNDWATER SAMPLE (GRAB)       Sample Collection Time:       Cloudy       Turbld         GROUNDWATER SAMPLE (GRAB)       Sample Collection Time:       Clear       Cloudy       Turbld         EPA 537M       Sample Collection Time:       Clear       Cloudy       Turbld         GROUNDWATER SAMPLE (GRAB)       Sample Collection Time:       Clear       Cloudy       Turbld

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### SAMPLE COLLECTION LOG SEDIMENT / SURFACE WATER / GROUNDWATER (GRAB)

L Project No:	M2032.0001			00.000 000 000 000 000 000 000 000 000
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late:	1/27/18			
ample Technician(s)	111111/111	111/5	0.360	
station ID:	Aren'S Build	lice 1511 (40	FF MREAS)	
ocation Description:	In grussy with	between alrend	PF AREAS) To wash hansor &	building 1511.
ype(s) of Sample (cir	cle all that apply):	Sediment	Surface Water	Groundwater
Sample Collected fro	m (circle one):	Channel/Ditch	Holding Pond/Lagoon	Lake/Pond
		River/Stream	Trench	Other Check mlve
		SEDIMENT SAN	IPLE	
Sample ID		Sample (	Collection Time:	
Sample Depth		Sedim	ent Description:	
Collection Method		A	nalysis/Method:	EPA 537M
Sample Container	<		Preservative:	NONE
	1			
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Preservative			lity (circle one): Clear	Cloudy Turbid Other
7.02				~
		GROUNDWATER SAME	PLE (GRAB)	~
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#### SES FIELD READINESS REVIEW FORM

#### Employee Name: Ash Willis

#### Job Number: M2032.0001

Job Location: Shaw AFB

#### Job Tasks:

Surface Sampling, Groundwater Sampling, Soil Sampling – Surface Soil and subsurface soil, Soil boring logging,, Surface water and sediment sampling, Mobe/demobe tasks

#### **Equipment Needed:**

Soil boring: Munsell Charts, Tape measure, pens, soil boring forms, USCS Table,

GW Sampling: YSI, peristaltic pump, multiRAE, sample containers etc.

Sediment Sampling: Sample containers, spoons

SW Sampling: Sample containers, SW collection device

Proper PPE for all above tasks is a minimum Level D, plus nitriles.

#### **Documents Needed:**

Field forms: Boring log, GW sampling log, sample log, log book, calibration sheets - Meshew to print copies 11-27

#### Significant training conducted prior to departure:

- Drivers training will be conducted on the 23<sup>rd</sup> or 24<sup>th</sup> specific date and time is yet to be determined. EAL has been approved.
- Dig permits were fully approved last week. Ash will call the various installation utilities on Wednesday this week to activate the dig permits as they all request a notification 3 days prior to beginning work.
   Additionally a further check was requested by the water utility at the WWTP. Greg is currently trying to get in contact with the operator but may have to track him down on Monday. We will not be starting at the WWTP until the operator has signed off on the locations.
- Surveyors are Wellston Associates same group from Robins and Dobbins.
- Abandonment requires pressure grouting
- Well permits have been submitted to the state.
- GSI will be sending sample containers. We'll collect them at Area 1 or Area 4.
- Field QC Rev 10 reviewed

Equipment Packed for travel on: Ordered 01/17/18 – Packed 01/18/18

Travel Dates: 01/22/18 (Mob) to completion 01/27/18

#### Site Supervisor Signature

area Carlson

#### SES FIELD READINESS REVIEW FORM

#### Employee Name: J Klein

Job Number: M2032.0001

Job Location: Shaw AFB

#### Job Tasks:

Surface Sampling, Groundwater Sampling, Soil Sampling – Surface Soil and subsurface soil, Soil boring logging,, Surface water and sediment sampling, Mobe/demobe tasks

#### **Equipment Needed:**

Soil boring: Munsell Charts, Tape measure, pens, soil boring forms, USCS Table,

GW Sampling: YSI, peristaltic pump, multiRAE, sample containers etc.

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- Well permits have been submitted to the state.
- GSI will be sending sample containers. We'll collect them at Area 1 or Area 4.
- Field QC Rev 10 reviewed

Equipment Packed for travel on: Ordered 01/17/18 – Packed 01/18/18

Travel Dates: 01/22/18 (Mob) to completion 01/27/18

Site Supervisor Signature

area Carlson

#### SES FIELD READINESS REVIEW FORM

#### Employee Name: Justin Vojak

Job Number: M2032.0001

Job Location: Shaw AFB

#### Job Tasks:

Surface Sampling, Groundwater Sampling, Soil Sampling – Surface Soil and subsurface soil, Soil boring logging,, Surface water and sediment sampling, Mobe/demobe tasks

#### **Equipment Needed:**

Soil boring: Munsell Charts, Tape measure, pens, soil boring forms, USCS Table,

GW Sampling: YSI, peristaltic pump, multiRAE, sample containers etc.

Sediment Sampling: Sample containers, spoons

SW Sampling: Sample containers, SW collection device

Proper PPE for all above tasks is a minimum Level D, plus nitriles.

#### **Documents Needed:**

Field forms: Boring log, GW sampling log, sample log, log book, calibration sheets - Meshew to print copies 11-27

#### Significant training conducted prior to departure:

- Drivers training will be conducted on the 23<sup>rd</sup> or 24<sup>th</sup> specific date and time is yet to be determined. EAL has been approved.
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- Surveyors are Wellston Associates same group from Robins and Dobbins.
- Abandonment requires pressure grouting
- Well permits have been submitted to the state.
- GSI will be sending sample containers. We'll collect them at Area 1 or Area 4.
- Field QC Rev 10 reviewed

#### Equipment Packed for travel on: Ordered 01/17/18 – Packed 01/18/18

Travel Dates: 01/22/18 (Mob) to completion 01/27/18

#### Site Supervisor Signature

area Carlson

### Appendix D

### Laboratory Case Narrative, Validation Report, and Validated Sample Results

DATA VALIDATION REPORT

M2032.0001 (Savannah) Shaw AFB

SAMPLE DELIVERY GROUP: B820260, B823124

**Prepared for** 

Aerostar SES LLC

March 5, 2018

MEC<sup>x</sup>, Inc. 8864 Interchange Drive Houston, Texas 77054

www.mecx.net





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#### **ACRONYMS AND ABBREVIATIONS**

°C	Celsius
%	Percent
%D	percent difference
В	blank contamination
CB	calibration blank
CCAL	continuing calibration
ССВ	continuing calibration blank
CCV	continuing calibration verification
COC	chain of custody
CLP	Contract Laboratory Program
EPA	US Environmental Protection Agency
ER	equipment rinsate
FB	field blank
FD	field duplicate
ICAL	initial calibration
ICB	initial calibration blank
ICL	instrument calibration limit
ICV	initial calibration verification
IS	internal standard
J	estimated value
LCS	laboratory control sample
LOD	limit of detection
LOQ	limit of quantification
MB	method blank
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
ND	nondetect
PARCC	precision, accuracy, representativeness, comparability, completeness
PFC	perfluorinated compound
QAPP	Quality Assurance Program Plan
QC	quality control
QSM	Quality Systems Manual
R	Rejected
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
SDG	sample delivery group
ТВ	trip blank
U	not detected
UJ	not detected; associated value is an estimate



#### I. INTRODUCTION

Task Order Title: M2032.0001 (Savannah) Shaw AFB

**Contract:** W9128F-15-D-0051

**MEC<sup>x</sup> Project No.:** 1529.001H.01

Sample Delivery Group: B820260, B823124

Project Manager: Jenny Vance

Matrix: Soil/Water

QC Level: Stage 2B, Stage 4

No. of Samples: 72

Laboratory: Maxxam

#### **TABLE 1 - SAMPLE IDENTIFICATION**

Sample Name	Lab Sample	Matrix	Collection	Method	Validation
	Name				Level
SHAW01-MW105-GW-019	FZJ955	WG	2018-01-25 09:56	E537 m	Stage 2B
SHAW01-MW105-GW-919	FZJ956	WG	2018-01-25 09:56	E537 m	Stage 2B
SHAW01-MW121A-GW-022	FZJ953	WG	2018-01-24 17:10	E537 m	Stage 2B
SHAW01-MW122A-GW-026	FZJ954	WG	2018-01-24 17:45	E537 m	Stage 2B
SHAW02-001-SO-018	FZJ943	SO	2018-01-25 15:45	E537 m	Stage 2B
SHAW02-002-SO-021	FZJ945	SO	2018-01-25 17:50	E537 m	Stage 2B
SHAW02-003-SO-019	FZJ944	SO	2018-01-25 16:50	E537 m	Stage 2B
SHAW03-FT3MW5-GW-016	FZJ960	WG	2018-01-25 17:40	E537 m	Stage 2B
SHAW03-FT3MW5-GW-916	FZJ961	WG	2018-01-25 17:40	E537 m	Stage 2B
SHAW04-001-SO-013	FZJ951	SO	2018-01-26 10:35	E537 m	Stage 2B
SHAW04-001-SS-001	FZJ950	SO	2018-01-26 10:00	E537 m	Stage 2B
SHAW04-002-SO-013	FZJ948	SO	2018-01-26 09:40	E537 m	Stage 4
SHAW04-002-SO-913	FZJ949	SO	2018-01-26 09:40	E537 m	Stage 4
SHAW04-002-SS-001	FZJ947	SO	2018-01-26 09:10	E537 m	Stage 2B
SHAW04-003-SS-001	FZJ952	SO	2018-01-26 11:05	E537 m	Stage 2B
SHAW06-001-GW-033	FZJ959	WG	2018-01-25 16:15	E537 m	Stage 2B
SHAW06-001-SO-028	FZJ940	SO	2018-01-24 09:10	E537 m	Stage 2B
SHAW06-001-SS-001	FZJ939	SO	2018-01-24 08:25	E537 m	Stage 4

Shaw AFB DV Report.0.Docx RV0



Sample Name	Lab Sample Name	Matrix	Collection	Method	Validation Level
SHAW06-002-GW-028	FZJ958	WG	2018-01-25 14:08	E537 m	Stage 2B
SHAW06-002-SO-026	FZJ937	SO	2018-01-23 17:20	E537 m	Stage 2B
SHAW06-002-SS-001	FZJ936	SO	2018-01-23 16:30	E537 m	Stage 2B
SHAW06-003-GW-027	FZJ957	WG	2018-01-25 13:55	E537 m	Stage 2B
SHAW06-003-SO-026	FZJ935	SO	2018-01-23 16:05	E537 m	Stage 2B
SHAW06-003-SS-001	FZJ933	SO	2018-01-23 14:55	E537 m	Stage 2B
SHAW-RS-001	FZJ934	WQ	2018-01-23 15:35	E537 m	Stage 2B
SHAW-RS-002	FZJ938	WQ	2018-01-24 08:10	E537 m	Stage 2B
SHAW-RS-003	FZJ942	WQ	2018-01-25 08:55	E537 m	Stage 2B
SHAW-RS-004	FZJ946	WQ	2018-01-26 08:55	E537 m	Stage 2B
SHAW-SB-001	FZJ941	WQ	2018-01-24 08:55	E537 m	Stage 2B
SHAW01-001-SO-002	FZY521	SO	2018-01-26 16:30	E537 m	Stage 2B
SHAW01-001-SO-902	FZY522	SO	2018-01-26 16:30	E537 m	Stage 2B
SHAW01-001-SS-001	FZY519	SO	2018-01-26 16:20	E537 m	Stage 2B
SHAW01-001-SS-901	FZY520	SO	2018-01-26 16:20	E537 m	Stage 2B
SHAW01-002-SO-003	FZY526	SO	2018-01-26 17:15	E537 m	Stage 2B
SHAW01-002-SS-001	FZY525	SO	2018-01-26 17:05	E537 m	Stage 2B
SHAW01-003-SO-002	FZY524	SO	2018-01-26 16:53	E537 m	Stage 2B
SHAW01-003-SS-001	FZY523	SO	2018-01-26 16:45	E537 m	Stage 2B
SHAW02-001-GW-021	FZY550	WG	2018-01-27 17:38	E537 m	Stage 2B
SHAW02-002-GW-022	FZY551	WG	2018-01-27 18:10	E537 m	Stage 2B
SHAW02-003-GW-020	FZY549	WG	2018-01-27 17:25	E537 m	Stage 2B
SHAW03-001-GW-018	FZY536	WG	2018-01-28 12:04	E537 m	Stage 4
SHAW03-001-SO-016	FZY518	SO	2018-01-26 15:40	E537 m	Stage 4
SHAW03-001-SS-001	FZY517	SO	2018-01-26 15:13	E537 m	Stage 2B
SHAW03-002-GW-017	FZY535	WG	2018-01-28 11:22	E537 m	Stage 2B
SHAW03-002-SO-017	FZY514	SO	2018-01-26 14:20	E537 m	Stage 2B
SHAW03-002-SS-001	FZY513	SO	2018-01-26 13:48	E537 m	Stage 2B
SHAW03-003-GW-018	FZY553	WG	2018-01-28 11:45	E537 m	Stage 2B

Shaw AFB DV Report.0.Docx RV0



Sample Name	Lab Sample Name	Matrix	Collection	Method	Validation Level
SHAW03-003-SO-016	FZY516	SO	2018-01-26 15:00	E537 m	Stage 2B
SHAW03-003-SS-001	FZY515	SO	2018-01-26 14:35	E537 m	Stage 2B
SHAW04-001-GW-018	FZY554	WG	2018-01-28 15:10	E537 m	Stage 2B
SHAW04-002-GW-018	FZY552	WG	2018-01-28 10:35	E537 m	Stage 2B
SHAW04-003-GW-015	FZY534	WG	2018-01-28 10:10	E537 m	Stage 2B
SHAW04-003-SO-012	FZY512	SO	2018-01-26 12:15	E537 m	Stage 4
SHAW04-004-SD-001	FZY543	SE	2018-01-27 12:04	E537 m	Stage 4
SHAW04-004-SD-901	FZY544	SE	2018-01-27 12:04	E537 m	Stage 2B
SHAW04-004-SW-001	FZY545	WS	2018-01-27 12:04	E537 m	Stage 4
SHAW04-004-SW-901	FZY546	WS	2018-01-27 12:04	E537 m	Stage 2B
SHAW05-001-SO-024	FZY540	SO	2018-01-30 10:50	E537 m	Stage 2B
SHAW05-001-SS-001	FZY542	SO	2018-01-27 13:47	E537 m	Stage 2B
SHAW05-002-GW-033	FZY548	WG	2018-01-27 15:50	E537 m	Stage 2B
SHAW05-002-SO-034	FZY539	SO	2018-01-27 13:05	E537 m	Stage 2B
SHAW05-002-SS-001	FZY531	SO	2018-01-27 12:03	E537 m	Stage 2B
SHAW05-002-SS-901	FZY532	SO	2018-01-27 12:03	E537 m	Stage 2B
SHAW05-003-GW-032	FZY537	WG	2018-01-28 13:54	E537 m	Stage 2B
SHAW05-003-SO-027	FZY530	SO	2018-01-27 11:17	E537 m	Stage 2B
SHAW05-003-SS-001	FZY529	SO	2018-01-27 10:42	E537 m	Stage 2B
SHAW05-004-GW-031	FZY538	WG	2018-01-28 14:42	E537 m	Stage 2B
SHAW05-004-SO-028	FZY528	SO	2018-01-27 10:08	E537 m	Stage 2B
SHAW05-004-SS-001	FZY527	SO	2018-01-27 09:28	E537 m	Stage 2B
SHAW-RS-005	FZY547	WQ	2018-01-27 15:40	E537 m	Stage 2B
SHAW-RS-006	FZY533	WQ	2018-01-28 08:45	E537 m	Stage 2B
SHAW-RS-007	FZY541	WQ	2018-01-30 10:00	E537 m	Stage 2B



#### II. SAMPLE MANAGEMENT

According to the case narratives and the chains-of-custody (COCs) provided by the laboratory for sample delivery groups (SDGs) B820260, B823124:

- Cooler temperatures recorded on the COCs indicated all samples were received at temperatures within the control limits of ≤6°C and >0°C.
- Field and laboratory personnel signed and dated the COCs.
- The case narrative noted custody seals were present and intact on the coolers upon receipt at the laboratory.
- Some chain of custody entries were corrected by overwriting the original entry, rather than lining out. Most corrections were initialed but not dated. All entries were legible.



#### TABLE 2 - DATA QUALIFIER REFERENCE

Qualifier	Definition
R	The sample results are rejected because of serious deficiencies in the ability to analyze the sample and to meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.
U	The analyte was analyzed for but was nondetect (ND) above the reported sample quantification limit.
В	The reported concentration is less than 5 times the concentration reported in an associated field or lab blank.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. J- denotes a low bias for the sample results and J+ for a high bias.
UJ	The material was analyzed for but was ND. The associated value is an estimate and may be inaccurate or imprecise.

#### TABLE 3 - REASON CODE REFERENCE

Reason Code	Definition
01	Sample received outside of 4+/-2 degrees Celsius (°C)
01A	Improper sample preservation
02	Holding time exceeded
02A	Extraction
02B	Analysis
03	Instrument performance – outside criteria
03A*	Bromofluorobenzene (BFB)
03B*	Decafluorotriphenylphosphine (DFTPP)
03C*	dichlorodiphenyltrichloroethane (DDT) and/or endrin % breakdown exceeds criteria
03D	Retention time windows
03E	Resolution
04	ICAL results outside specified criteria
04A	Compound mean RRF QC criteria not met
04B	Individual % RSD criteria not met
04C	r < 0.995 or r <sup>2</sup> < 0.99
04D	ICAL % Recovery
05	Continuing calibration results outside specified criteria



Reason Code	Definition
05A	Compound mean RRF QC criteria not met
05B	Compound % Difference QC criteria not met
06	Result qualified as a result of the 5x/10x blank correction
06A	Method or preparation blank
06B	ICB or CCB
06C	ER
06D	ТВ
06E	FB
07	Surrogate recoveries outside control limits
07A	Sample
07B	Associated MB or LCS
08	MS/MSD/Duplicate results outside criteria
08A	MS and/or MSD recovery not within control limits (accuracy)
08B	% RPD outside acceptance criteria (precision)
09*	Post digestion spike outside criteria graphite furnace atomic absorption (GFAA)
10	Internal standards outside specified control limits
10A	Recovery
10B	Retention time
11	LCS recoveries outside specified limits
11A	Recovery
11B	% RPD (if run in duplicate)
12*	Interference check standard
13*	Serial dilution
14*	Tentatively identified compounds
15	Quantification
16	Multiple results available; alternate analysis preferred
17	Field duplicate RPD criteria is exceeded
18*	Percent difference between original and second column exceeds QC criteria
19	Professional judgment was used to qualify the data
20*	Pesticide clean-up checks
21	Target compound identification



Reason Code	Definition
22*	Radiological calibration
23*	Radiological quantification
24	Reported result and/or lab qualifier revised to reflect validation findings

\*Indicates that this code is not expected to apply to the evaluation of PFAS analyses



#### III. METHOD ANALYSIS- PERFLUORINATED COMPOUNDS BY MODIFIED EPA METHOD 537 MODIFIED

L. Calvin of MEC<sup>x</sup> reviewed these SDGs March 5 to March 9, 2018.

#### **III.1. HOLDING TIMES**

#### SDGs B820260, B823124

Although the case narratives noted several method holding time exceedances, the holding times specified in the QAPP were met. Samples were extracted within 28 days of collection and all samples were analyzed within 45 days of extraction.

#### **III.2.** CALIBRATION

Calibration criteria were met.

#### III.2.1. INITIAL CALIBRATION

#### SDGs B820260, B823124

Initial calibration criteria were met. Recoveries were within 70-130% for the lowest level of each initial calibration and 75-125% for the remaining levels, and all correlation coefficient r<sup>2</sup> values were within the control limit of  $\geq$ 0.990 or r values  $\geq$ 0.995. Applicable %RSDs were within the control limit of  $\leq$ 20%. The calculated peak asymmetry factors were within the control range of 0.8-1.5. MEC<sup>X</sup> noted the laboratory utilized as the calibration method a weighted (1/X) linear initial calibration standard curve not forced through zero.

#### III.2.2. CONTINUING CALIBRATION

#### SDGs B820260, B823124

The initial calibration verification (ICV) and continuing calibration verification (CCV) recoveries were within the control limits of 75-125%. Low-level instrument sensitivity check standard (ISC) recoveries were within the control limits of 70-130%.

#### **III.3. QUALITY CONTROL SAMPLES**

#### III.3.1. METHOD BLANKS

#### SDGs B820260, B823124

The method blanks associated with the analyses of the soil and water samples had no target analyte detects above the respective soil and water detection limits (DLs).

#### III.3.2. LABORATORY CONTROL SAMPLES

#### SDGs B820260, B823124

LCS recoveries were within the control limits of 70-130%, and RPDs for water LCS/LCSD pairs were within the control limit of  $\leq$ 30%.

#### III.3.3. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Outliers affecting parent sample data and qualifications assigned are noted below. Qualifications were not assigned for recovery outliers not occurring in both the MS and MSD, or for RPD outliers or high recoveries if the outlier compound was not detected in the parent sample. If the parent sample concentration of an analyte exceeded 4× the spike amount, recoveries and the RPD were

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not evaluated. With exceptions noted below, recoveries and RPDs affecting sample data were within the control limits of 70-130% and ≤30%, respectively

#### SDG B820260

MS/MSD analyses were performed on soil sample SHAW04-002-SS-001 and on water sample SHAW01-MW105-GW-019. Recoveries were below the control limits of 70-130% for PFHxS in the MS (51%) and MSD (41%) of water sample SHAW01-MW105-GW-019. The detect for PFHxS was qualified as estimated (J) in the parent sample.

#### SDG B823124

MS/MSD analyses were performed on soil samples SHAW01-001-SO-002, SHAW05-001-SS-001, SHAW01-001-SS-001, SHAW04-004-SD-001, and on water sample SHAW04-004-SW-001. Recoveries were below the control limits of 70-130% for 6:2-FTS in the MS (13%) and MSD (59%) of water sample SHAW04-004-SW-001, and the RPD exceeded the control limit of  $\leq$ 30% AT 129%. The detect for 6:2-FTS was qualified as estimated (J) in the parent sample.

#### III.4. FIELD QC SAMPLES

MEC<sup>x</sup> evaluated field QC samples, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. MEC<sup>x</sup> used the remaining detects to evaluate the associated site samples. Findings associated with field QC samples are summarized below.

#### III.4.1. FIELD BLANKS AND EQUIPMENT BLANKS

The field and equipment blanks are listed in the tables below. Site sample results were not qualified based on field blank detects, as the source water was used only for decontamination of drilling equipment and was not used for decontamination of sampling equipment. Equipment blank SHAW-RS-007 was associated with soil samples. The equipment blank concentrations in sample SHAW-RS-007 were not considered sufficient to qualify soil sample detects above the LOQ. As a conservative measure, detects for the equipment blank contaminants below the LOQ in soil site samples were qualified as possible field contamination (B).

Field or Equipment Blank	Detects	Concentration µg/L	LOQ µg/L
	6:2-FTS	0.64	0.20
	PFBA	0.018 J	0.020
	PFHpA	0.0094 J	0.020
	PFHxS	0.011 J	0.020
SHAW-SB-001 (field blank)	PFHxA	0.27	0.020
	PFOA	0.0056 J	0.020
	PFOSA	0.016 J	0.020
	PFOS	0.84	0.20
	PFPeA	0.016 J	0.020

#### Table 5-FB/EB Detects

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Field or Equipment Blank	Detects	Concentration µg/L	LOQ μg/L
SHAW-RS-001 (equipment blank)	none	N/A	N/A
SHAW-RS-002 (equipment blank)	none	N/A	N/A
SHAW-RS-003 (equipment blank)	none	N/A	N/A
SHAW-RS-004 (equipment blank)	none	N/A	N/A

#### SDG B823124

Field or Equipment Blank	Detects	Concentration µg/L	LOQ μg/L
SHAW-RS-005 (equipment blank)	none	N/A	N/A
SHAW-RS-006 (equipment blank)	none	N/A	N/A
	6:2-FTS	0.0066	0.020
SHAW-RS-007 (equipment blank)	PFHxA	0.0035	0.020
	PFPeA	0.0075	0.020

#### III.4.2. FIELD DUPLICATES

Field duplicate pairs are listed below. RPDs for common detects above the LOQ were within the control limit of  $\leq$ 30%, and detects below the LOQ in one or both samples of a pair were within the reasonable control limit of ±LOQ, with exceptions noted in the table below. Results for the outlier target analytes were qualified as estimated (J or UJ) in both samples of a pair.

#### Table 6-FD RPDs

#### SDG B820260

Parent Sample	Field Duplicate	Target Analyte	<b>RPD Outliers</b>
SHAW04-002-SO-013	SHAW04-002-SO-913	PFHxS	96%
		PFHxA	>±RL
		PFOS	155%
SHAW01-MW105-GW-019	SHAW01-MW105-GW-919	N/A	None
SHAW03-FT3MW5-GW-016	SHAW03-FT3MW5-GW-916	N/A	None

#### SDG B823124

Parent Sample	Field Duplicate	Target Analyte	RPD Outliers
		PFDS	138%
SHAW01-001-SS-001	SHAW01-001-SS-901	PFHxA	64%
		PFOS	88%
		PFHxS	33%
SHAW01-001-SO-002	SHAW01-001-SO-902	PFOA	>±RL
		PFOS	110%
SHAW05-002-SS-001	SHAW05-002-SS-901	N/A	None

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Parent Sample	Field Duplicate	Target Analyte	<b>RPD Outliers</b>
SHAW04-004-SD-001	SHAW04-004-SD-901	6:2-FTS	60%
		8:2-FTS	38%
		PFDS	148%
		PFOSA	116%
		PFOS	88%
SHAW04-004-SW-001	SHAW04-004-SW-901	N/A	None

#### III.5. INTERNAL STANDARDS PERFORMANCE

The applicable labeled internal standard recoveries were within the control limits of  $\pm 50\%$  of the average peak areas of the initial calibration, except as noted in the table below. Results for the associated target compounds were qualified as estimated (UJ for nondetects and J for detects) in the affected samples.

#### SDG B820260

Several samples were re-extracted and reanalyzed for internal standard outliers in the initial analyses. The re-extraction analyses were not performed at further dilutions, and only the acceptable internal standard and associated analyte(s) were reported from the re-extraction analyses. All recoveries were within control limits.

#### SDG B823124

Internal Standard	% Recovery	Affected Samples	Associated Target Analyte(s)
	38%	SHAW01-001-SO-002	
13C2-PFTeDA	49%	SHAW05-004-GW-031	PFTeDA, PFTrDA
	26%	SHAW05-001-SS-001	

#### **III.6.** COMPOUND IDENTIFICATION

#### SDGs B820260, B823124

Compound identification was verified for site samples SHAW06-001-SS-001, SHAW04-002-SO-013 and SHAW01-MW105-GW-019 (SDG B820260), and SHAW04-003-SO-012, SHAW03-001-SO-016, SHAW04-004-SD-001, SHAW03-001-GW-018, and SHAW04-004-SW-001 (B823124). The laboratory analyzed for 18 perfluorinated compounds by Modified EPA Method 537. Review of retention times and the ion chromatograms indicated no issues with compound identification.

#### **III.7.** COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS

Calculations were verified and sample results reported on the sample result summaries were verified against the raw data for the samples listed above (see Compound Identification section). Quantitation verification was limited based upon the significant figures presented in the raw data and were therefore estimations of the actual sample amounts. The reviewer considered the concentration verified within that limitation. The laboratory calculated and reported compound-specific detection limits. Detects below the LOQ were qualified as estimated (J). Nondetects are valid to the LOD.

The laboratory integrated isomeric forms for the PFCs with linear and branched isomers as required by Revision 1.1 of EPA Method 537.

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Most samples were initially analyzed undiluted. The samples listed below were either re-extracted using reduced sample volumes and/or reanalyzed at one or more further dilutions to report various target analytes within the linear range of the calibration. Analytes were reported from the least dilute analysis possible of multiple dilutions to report all target analytes within the linear calibration range.

#### SDG B820260

Based on screening results indicating the presence of high concentrations of target analytes, six of the nine water site samples were extracted using reduced sample volumes, resulting in effective initial dilutions, and four were reanalyzed at further dilutions for one or more target analytes. One of the 15 soil samples was reanalyzed at a dilution for PFOS only. The DLs and LOQs were adjusted accordingly. Remaining results were reported from the undiluted or least dilute analyses.

#### SDG B823124

Based on screening results indicating the presence of high concentrations of target analytes, six of the 14 water site samples were extracted using reduced sample volumes, resulting in effective initial dilutions, and five were reanalyzed at further dilutions for one or more target analytes. All soil samples were initially analyzed undiluted, and 11 samples were reanalyzed at dilutions for one or more target analytes. The DLs and LOQs were adjusted accordingly. Remaining results were reported from the undiluted or least dilute analyses.

Sample SHAW01-001-SO-002 reported PFHxS from two analyses. The reviewer chose the most technically acceptable analysis for the target compound.

#### **III.8. SYSTEM PERFORMANCE**

No issues were noted with system performance.



#### IV. SUMMARY AND CONCLUSIONS

MEC<sup>x</sup> evaluated a total of 1152 data records from field samples during the validation and qualified 53 records (4.6% of the data) as estimated values (J for detects and UJ for nondetects). The qualification was required for potential equipment rinsate contamination, matrix spike recovery and precision outliers, internal standard outliers and field duplicate precision outliers. Nondetect compounds were flagged (U) to indicate that the compound was analyzed for but not detected above the limit of detection (LOD). Specific qualification is discussed in the text above.

Overall, the quality of the data was acceptable. The precision (97.5%) and accuracy results (97.9%) were acceptable. Other data quality indicators (DQI) (representativeness, comparability and completeness) met the project objectives. Each of these DQIs is discussed below.

#### IV.1. PRECISION

Precision is a measure of the agreement between duplicate sample measurements of the same quantity and is reflected in the relative percent difference (RPD) between spikes and the RPD for the field duplicate pair analysis. Precision was measured at 97.5% primarily due to field duplicate outliers. Precision was considered acceptable for the project.

#### IV.2. ACCURACY

Accuracy is measured by the results from the recovery of known amounts of compounds or elements from calibration, method blanks, laboratory control samples (LCS), matrix spikes (MS), internal standard recoveries and surrogate recoveries. The primary qualification for accuracy was for potential equipment rinsate contamination (1.4%). The accuracy was 97.9%. Accuracy was considered acceptable for the project.

#### IV.3. REPRESENTATIVENESS

The measures of representativeness – sample handling, analytical blank analysis, were met. Designated analytical protocols were followed. The laboratory did utilize a weighted 1/X calibration curve which was not forced through zero. Although this is a deviation from Method 537, it is acceptable on DoD projects and was considered acceptable by the reviewer. Holding times were met for all analyses. No analytical problems were noted which would impact data representativeness.

#### IV.4.COMPARABILITY

The samples were analyzed using appropriate approved methods of analysis. All data were reported correctly using standard units.

#### **IV.5.COMPLETENESS**

Completeness is the amount of validated data compared to the planned amount of data and is expressed as a percentage of the usable data divided by the total number of data points. Of the 1152 target data points, no data points were rejected, resulting in a completeness of 100%.



#### V. REFERENCES

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Aerostar, 2016a. Final Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP) for Site Inspection of Fire Fighting Foam Usage at Various Air Force Bases in the Eastern United States, Addendum 9, Field Sampling Plan for Shaw Air Force Base Sumter County, South Carolina, February 2017.

Department of Defense (DOD), 2017. *DoD Quality Systems Manual for Environmental Laboratories,* Version 5.1. January 2017.

EPA, 2009. Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Version 1.1, September 2009. EPA Document #: EPA/600/R-08/092.

EPA, 2014. EPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review, EPA/540-R-014-002.

EPA (U.S. Environmental Protection Agency), January 2009. OSWER 9200-1-85. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use.* EPA-540/R-08-005.



## **1.0 Project Narrative**

Maxxam Analytics International 6740 Campobello Rd. Mississauga, Ontario, Canada L5N 2L8 1-800-668-0639 www.maxxamanalytics.com

#### Maxxam Job: B820260 - Soil Analysis

#### Sample Analysis

Soil extracts were initially pre-screened and estimated concentrations were obtained so that samples could be appropriately diluted for analysis on QC batch 5392395 (2018/02/17). Due to high concentration, dilution was required for Perfluorooctanesulfonate (PFOS) in the following sample:

FZJ936 SHAW06-002-SS-001

Detection limit was adjusted accordingly.

#### Quantitation of PFAS

Many PFAS (e.g. PFOS) have several isomeric forms that may show up as separate or partially-merged peaks in the analytical chromatograms. These peaks will be integrated and the areas summed such that the result represents the concentration of the sum of the linear and branched isomers, per USEPA (2009). Instrumentation is calibrated using certified quantitative standards containing only the linear isomer for all target analytes, except Perfluorooctane sulfonate (PFOS) and Perfluorohexane sulfonate (PFHxS), which are calibrated using certified branched and linear isomer mixtures. As additional certified reference materials containing branched and linear isomers become commercially available, they will be incorporated into the analytical method.

#### Data Qualifiers

**U** – Analyte was not detected and is reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

J – The reported result is an estimated value (e.g., matrix interference was observed, or the analyte was detected at a concentration outside the calibration range).

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#### Maxxam Job: B820260 - Water Analysis

#### Sample Analysis

Samples were initially pre-screened and estimated concentrations were obtained so that appropriate sample volumes could be extracted on QC batches 5386102 (2018/02/08), 5389177 (2018/02/09), 5391181 (2018/02/09-12) and 5393111 (2018/02/13). Due to high concentrations, the following samples were analyzed for selected analytes using reduced sample extraction volumes:

FZJ941	SHAW-SB-001	Perfluorooctanesulfonate (PFOS), 6:2 Fluorotelomersulfonate (6:2FTS)
FZJ953	SHAW01-MW121A-GW-022	All analytes
FZJ954	SHAW01-MW122A-GW-026	All analytes
FZJ955	SHAW01-MW105-GW-019	Perfluorohexanesulfonate (PFHxS), Perfluorooctanesulfonate (PFOS)
FZJ956	SHAW01-MW105-GW-919	Perfluorohexanesulfonate (PFHxS), Perfluorooctanesulfonate (PFOS)
FZJ960	SHAW03-FT3MW5-GW-016	All analytes
FZJ961	SHAW03-FT3MW5-GW-916	All analytes

Detection limits were adjusted accordingly.

#### Extracted Internal Standard Analytes

The extracted internal standard analytes  ${}^{13}C_2$ -Perfluorotetradecanoic acid ( ${}^{13}C_2$ -PFTeDA) and  ${}^{13}C_8$ -Perfluorooctane sulfonamide ( ${}^{13}C_8$ -PFOSA) are used to quantify native Perfluorotridecanoic acid (PFTrDA) & Perfluorotetradecanoic acid (PFTeDA) and Perfluorooctane sulfonamide (PFOSA) respectively. The recoveries observed for these extracted internal standard analytes were below the defined lower control limit (LCL) for the following samples:

FZJ934	SHAW-RS-001	( <sup>13</sup> C <sub>8</sub> -PFOSA)
FZJ957	SHAW06-003-GW-027	( <sup>13</sup> C <sub>2</sub> -PFTeDA)

These samples were re-extracted and re-analyzed for the associated native analytes on QC batches 5396699 (2018/02/15) and 5395679 (2018/02/13) respectively, past the method defined hold time. Because of their chemical structures, per- and polyfluorinated alkyl substances (PFAS) are chemically and biologically stable in the environment and resist typical environmental degradation processes. This would suggest the hold time exceedance would not have a significant impact on the data quality. Acceptable extracted internal standard analyte recoveries were obtained on re-analysis.

#### Quantitation of PFAS

Many PFAS (e.g. PFOS) have several isomeric forms that may show up as separate or partially-merged peaks in the analytical chromatograms. These peaks will be integrated and the areas summed such that the result represents the concentration of the sum of the linear and branched isomers, per USEPA (2009). Instrumentation is calibrated using certified quantitative standards containing only the linear isomer for all target analytes, except Perfluorooctane sulfonate (PFOS) and Perfluorohexane sulfonate (PFHxS), which are calibrated using certified branched and linear isomer mixtures. As additional certified reference materials containing branched and linear isomers become commercially available, they will be incorporated into the analytical method.

#### Data Qualifiers

**U** – Analyte was not detected and is reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

J – The reported result is an estimated value (e.g., matrix interference was observed, or the analyte was detected at a concentration outside the calibration range).

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# **1.0 Project Narrative**

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#### Sample Analysis

Soil extracts were initially pre-screened and estimated concentrations were obtained so that samples could be appropriately diluted for analysis on QC batches 5398751 (2018/02/15-16), 5398813 (2018/02/15-16) and 5404121 (2018/02/20-21). Due to high concentrations, dilutions were required for selected analytes in the following samples:

FZY513	SHAW03-002-SS-001	All analytes
FZY515	SHAW03-003-SS-001	Perfluorooctanesulfonate (PFOS)
FZY516	SHAW03-003-SO-016	Perfluorohexanesulfonate (PFHxS), Perfluorooctanesulfonate (PFOS), 6:2 Fluorotelomersulfonate (6:2FTS)
FZY518	SHAW03-001-SO-016	Perfluorooctanesulfonate (PFOS), 6:2 Fluorotelomersulfonate (6:2FTS)
FZY519	SHAW01-001-SS-001	Perfluorooctanesulfonate (PFOS)
FZY520	SHAW01-001-SS-901	Perfluorohexanesulfonate (PFHxS), Perfluorooctanesulfonate (PFOS)
FZY522	SHAW01-001-SO-902	Perfluorooctanesulfonate (PFOS)
FZY523	SHAW01-003-SS-001	Perfluorooctanesulfonate (PFOS)
FZY524	SHAW01-003-SO-002	Perfluorooctanesulfonate (PFOS)
FZY525	SHAW01-002-SS-001	Perfluorooctanesulfonate (PFOS)
FZY526	SHAW01-002-SO-003	Perfluorooctanesulfonate (PFOS)
FZY544	SHAW04-004-SD-901	Perfluorooctanesulfonate (PFOS)

Detection limits were adjusted accordingly.

The Perfluorobutanoic Perfluorohexanoic recoveries observed for acid (PFBA), acid (PFHxA), Perfluorobutanesulfonate (PFBS), Perfluorooctanoic acid (PFOA), Perfluoroundecanoic acid (PFUnA). Perfluorotridecanoic acid (PFTrDA), Perfluorotetradecanoic acid (PFTeDA), Perfluorooctane sulfonamide (PFOSA), 6:2 Fluorotelomersulfonate (6:2FTS) and 8:2 Fluorotelomersulfonate (8:2FTS) were above acceptance limits for the Spike (LCS) on QC batches 5398751 (2018/02/15-16) and 5398813 (2018/02/15-16). Samples were re-extracted and reanalyzed for these analytes on QC batches 5406394 (2018/02/21-22) and 5407835 (2018/02/22).

The following samples were initially analyzed on QC batch 5398751 (2018/02/15-16):

FZY517 SHAW03-001-SS-001 FZY526 SHAW01-002-SO-003

The apparent recoveries of extracted internal standard analytes were below acceptance criteria for these samples, likely resulting from over-addition of the injection internal standards. These samples were re-extracted and re-analyzed on QC batch 5406394 (2018/02/21-22).

#### Extracted Internal Standard Analytes

The extracted internal standard  ${}^{13}C_2$ -Perfluorotetradecanoic acid ( ${}^{13}C_2$ -PFTeDA) is used to quantify native Perfluorotridecanoic acid (PFTrDA) & Perfluorotetradecanoic acid (PFTeDA). The recoveries observed for this extracted internal standard analyte were below the defined lower control limit (LCL) for the following samples:

FZY521SHAW01-001-SO-002FZY522SHAW01-001-SO-902FZY542SHAW05-001-SS-001

Samples were re-extracted and re-analyzed for the associated native analytes on QC batches 5410884 (2018/02/23) and 5413446 (2018/02/28). Low  ${}^{13}C_2$ -PFTeDA recoveries were confirmed for FZY542 (SHAW05-001-SS-001) and

FZY521 (SHAW01-001-SO-002) while acceptable recovery was obtained for FZY522 (SHAW01-001-SO-902) on reanalysis.

#### Quantitation of PFAS

Many PFAS (e.g. PFOS) have several isomeric forms that may show up as separate or partially-merged peaks in the analytical chromatograms. These peaks will be integrated and the areas summed such that the result represents the concentration of the sum of the linear and branched isomers, per USEPA (2009). Instrumentation is calibrated using certified quantitative standards containing only the linear isomer for all target analytes, except Perfluorooctane sulfonate (PFOS) and Perfluorohexane sulfonate (PFHxS), which are calibrated using certified branched and linear isomer mixtures. As additional certified reference materials containing branched and linear isomers become commercially available, they will be incorporated into the analytical method.

#### Data Qualifiers

**U** – Analyte was not detected and is reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

J – The reported result is an estimated value (e.g., matrix interference was observed, or the analyte was detected at a concentration outside the calibration range).

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# Validated Sample Result Forms: B820260

Sample Name SHAW01-MW1	05-GW-019	Ν	Aatrix T	ype: W	R	lesult Typ	e: TRG		
Lab Sample Name: FZJ955	Sample	e Date/Time:	2018-	01-25	09:56		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	0.040	0.0054	0.015	0.020	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	0.074	0.0055	0.015	0.020	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.027	0.0074	0.015	0.020	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	1.1	0.056	0.15	0.20	ug/L		J	08A
PERFLUOROHEXANOIC ACID	307-24-4	0.25	0.0035	0.010	0.020	ug/L			
PERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	1.4	0.060	0.15	0.20	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	0.096	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	0.047	0.0075	0.018	0.020	ug/L			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name S	HAW01-MW	105-GW-919		Matrix T	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Name:	FZJ956	Sample	e Date/Time	2018-	01-25	09:56		Validati	on Level: St	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER	SULFONATE	27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
3:2 FLUOROTELOMER	SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANE	SULFONATE	29420-43-3	0.034	0.0054	0.015	0.020	ug/L			
PERFLUOROBUTANO	C ACID	375-22-4	0.076	0.0055	0.015	0.020	ug/L			
PERFLUORODECANE	SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANO	C ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODECA	NOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANC	DIC ACID	375-85-9	0.024	0.0074	0.015	0.020	ug/L			
PERFLUOROHEXANE	SULFONATE	108427-53-8	1.1	0.056	0.15	0.20	ug/L			
PERFLUOROHEXANO	IC ACID	307-24-4	0.27	0.0035	0.010	0.020	ug/L			
PERFLUORONONANO	IC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
PERFLUOROOCTANE	SULFONAMIDE	E 754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
PERFLUOROOCTANE	SULFONATE	1763-23-1	1.4	0.060	0.15	0.20	ug/L			
PERFLUOROOCTANO	C ACID	335-67-1	0.092	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTANC	DIC ACID	2706-90-3	0.052	0.0075	0.018	0.020	ug/L			
PERFLUOROTETRADE	CANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECA	NOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDECA	NOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name SH	IAW01-MW	/121A-GW-022		Matrix 7	Г <b>уре:</b> W	R	esult Typ	e: TRG		
Lab Sample Name:	FZJ953	Sample	Date/Time	2018-	-01-24	17:10		Validati	on Level: St	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER S	SULFONATE	27619-97-2	< 0.15	0.066	0.15	0.20	ug/L	U	U	
3:2 FLUOROTELOMER S	SULFONATE	39108-34-4	< 0.15	0.066	0.15	0.20	ug/L	U	U	
PERFLUOROBUTANE S	ULFONATE	29420-43-3	0.085	0.054	0.15	0.20	ug/L	J	J	
PERFLUOROBUTANOIC	ACID	375-22-4	< 0.15	0.055	0.15	0.20	ug/L	U	U	
PERFLUORODECANE S	ULFONATE	335-77-3	< 0.15	0.060	0.15	0.20	ug/L	U	U	
PERFLUORODECANOIC	ACID	335-76-2	< 0.15	0.061	0.15	0.20	ug/L	U	U	
PERFLUORODODECAN	OIC ACID	307-55-1	< 0.10	0.050	0.10	0.20	ug/L	U	U	
PERFLUOROHEPTANOI	C ACID	375-85-9	0.21	0.074	0.15	0.20	ug/L			
PERFLUOROHEXANE S	ULFONATE	108427-53-8	8.5	0.056	0.15	0.20	ug/L			
PERFLUOROHEXANOIC	CACID	307-24-4	1.6	0.035	0.10	0.20	ug/L			
PERFLUORONONANOIC	CACID	375-95-1	< 0.18	0.087	0.18	0.20	ug/L	U	U	
PERFLUOROOCTANE S	ULFONAMIDE	E 754-91-6	< 0.10	0.034	0.10	0.20	ug/L	U	U	
PERFLUOROOCTANE S	ULFONATE	1763-23-1	26	0.30	0.45	1.0	ug/L			
PERFLUOROOCTANOIC	ACID	335-67-1	0.88	0.033	0.10	0.20	ug/L			
PERFLUOROPENTANOI	C ACID	2706-90-3	0.31	0.075	0.18	0.20	ug/L			
PERFLUOROTETRADEC	CANOIC ACID	376-06-7	< 0.10	0.027	0.10	0.20	ug/L	U	U	
PERFLUOROTRIDECAN	OIC ACID	72629-94-8	< 0.10	0.038	0.10	0.20	ug/L	U	U	
PERFLUOROUNDECAN	OIC ACID	2058-94-8	< 0.10	0.025	0.10	0.20	ug/L	U	U	

Sample Name SHAV	V01-MW	122A-GW-026	I	Matrix 7	Г <b>уре:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: F	ZJ954	Sample	Date/Time	2018-	-01-24	17:45		Validati	on Level: Sta	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SUL	FONATE	27619-97-2	< 0.075	0.033	0.075	0.10	ug/L	U	U	
3:2 FLUOROTELOMER SUL	FONATE	39108-34-4	< 0.075	0.033	0.075	0.10	ug/L	U	U	
PERFLUOROBUTANE SULF	ONATE	29420-43-3	0.063	0.027	0.075	0.10	ug/L	J	J	
PERFLUOROBUTANOIC AC	D	375-22-4	0.41	0.028	0.075	0.10	ug/L			
PERFLUORODECANE SULF	ONATE	335-77-3	< 0.075	0.030	0.075	0.10	ug/L	U	U	
PERFLUORODECANOIC AC	CID	335-76-2	< 0.075	0.031	0.075	0.10	ug/L	U	U	
PERFLUORODODECANOIC	ACID	307-55-1	< 0.050	0.025	0.050	0.10	ug/L	U	U	
PERFLUOROHEPTANOIC A	CID	375-85-9	0.33	0.037	0.075	0.10	ug/L			
PERFLUOROHEXANE SULF	FONATE	108427-53-8	12	0.14	0.38	0.50	ug/L			
PERFLUOROHEXANOIC AC	CID	307-24-4	3.9	0.018	0.050	0.10	ug/L			
PERFLUORONONANOIC AC	CID	375-95-1	0.053	0.044	0.090	0.10	ug/L	J	J	
PERFLUOROOCTANE SULF	ONAMIDE	754-91-6	< 0.050	0.017	0.050	0.10	ug/L	U	U	
PERFLUOROOCTANE SULF	ONATE	1763-23-1	5.4	0.15	0.38	0.50	ug/L			
PERFLUOROOCTANOIC AC	CID	335-67-1	2.9	0.017	0.050	0.10	ug/L			
PERFLUOROPENTANOIC A	CID	2706-90-3	0.78	0.038	0.090	0.10	ug/L			
PERFLUOROTETRADECAN	OIC ACID	376-06-7	< 0.050	0.014	0.050	0.10	ug/L	U	U	
PERFLUOROTRIDECANOIC	ACID	72629-94-8	< 0.050	0.019	0.050	0.10	ug/L	U	U	
PERFLUOROUNDECANOIC	ACID	2058-94-8	< 0.050	0.013	0.050	0.10	ug/L	U	U	

Sample Name SHAV	W02-001-9	SO-018		Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: F	FZJ943	Sampl	e Date/Time	e: 2018-	-01-25	15:45		Validati	on Level: St	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SUL	FONATE	27619-97-2	< 0.75	0.24	0.75	0.94	ug/kg	U	U	
3:2 FLUOROTELOMER SUL	FONATE	39108-34-4	< 0.75	0.31	0.75	0.94	ug/kg	U	U	
PERFLUOROBUTANE SULF	FONATE	29420-43-3	< 0.47	0.16	0.47	0.94	ug/kg	U	U	
PERFLUOROBUTANOIC AC	CID	375-22-4	< 0.47	0.22	0.47	0.94	ug/kg	U	U	
PERFLUORODECANE SULF	FONATE	335-77-3	< 0.75	0.37	0.75	0.94	ug/kg	U	U	
PERFLUORODECANOIC AC	CID	335-76-2	< 0.75	0.26	0.75	0.94	ug/kg	U	U	
PERFLUORODODECANOIC	ACID	307-55-1	< 0.75	0.26	0.75	0.94	ug/kg	U	U	
PERFLUOROHEPTANOIC A	CID	375-85-9	< 0.47	0.18	0.47	0.94	ug/kg	U	U	
PERFLUOROHEXANE SULF	FONATE	108427-53-8	1.0	0.23	0.47	0.94	ug/kg			
PERFLUOROHEXANOIC AC	CID	307-24-4	0.24	0.13	0.47	0.94	ug/kg	J	J	
PERFLUORONONANOIC AG	CID	375-95-1	< 0.47	0.21	0.47	0.94	ug/kg	U	U	
PERFLUOROOCTANE SULF	FONAMIDE	754-91-6	< 0.47	0.13	0.47	0.94	ug/kg	U	U	
PERFLUOROOCTANE SULF	FONATE	1763-23-1	19	0.24	0.75	0.94	ug/kg			
PERFLUOROOCTANOIC AC	CID	335-67-1	0.57	0.24	0.75	0.94	ug/kg	J	J	
PERFLUOROPENTANOIC A	CID	2706-90-3	< 0.75	0.24	0.75	0.94	ug/kg	U	U	
PERFLUOROTETRADECAN	OIC ACID	376-06-7	< 0.75	0.29	0.75	0.94	ug/kg	U	U	
PERFLUOROTRIDECANOIC	CACID	72629-94-8	< 0.75	0.31	0.75	0.94	ug/kg	U	U	
PERFLUOROUNDECANOIC	ACID	2058-94-8	< 0.75	0.32	0.75	0.94	ug/kg	U	U	

Sample Name SHAW02-002-	-SO-021		Matrix T	ype: S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ945	Sample	e Date/Time	e: 2018-	01-25	17:50		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.88	0.29	0.88	1.1	ug/kg	U	U	
3:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.55	0.19	0.55	1.1	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.55	0.25	0.55	1.1	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.88	0.43	0.88	1.1	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.88	0.31	0.88	1.1	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.88	0.31	0.88	1.1	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.55	0.21	0.55	1.1	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	< 0.55	0.26	0.55	1.1	ug/kg	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.55	0.15	0.55	1.1	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	< 0.55	0.24	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	E 754-91-6	< 0.55	0.15	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	0.66	0.29	0.88	1.1	ug/kg	J	J	
PERFLUOROOCTANOIC ACID	335-67-1	<0.88	0.28	0.88	1.1	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	<0.88	0.28	0.88	1.1	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	<0.88	0.34	0.88	1.1	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.88	0.37	0.88	1.1	ug/kg	U	U	

Sample Name SHAW02-003-	-SO-019		Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ944	Sampl	e Date/Time	e: 2018-	-01-25	16:50		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.80	0.26	0.80	1.0	ug/kg	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.50	0.17	0.50	1.0	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.50	0.23	0.50	1.0	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.80	0.39	0.80	1.0	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.50	0.19	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	< 0.50	0.24	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.50	0.14	0.50	1.0	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	< 0.50	0.22	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMID	E 754-91-6	< 0.50	0.14	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	1.0	0.26	0.80	1.0	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	< 0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.80	0.31	0.80	1.0	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.80	0.34	0.80	1.0	ug/kg	U	U	

Sample Name SHAW03-FT31	MW5-GW-016		Matrix 7	Г <b>уре:</b> W	R	lesult Typ	e: TRG		
Lab Sample Name: FZJ960	Sample	e Date/Time	e: 2018	-01-25	17:40		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	32	0.33	0.75	1.0	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	4.9	0.066	0.15	0.20	ug/L			
ERFLUOROBUTANE SULFONATE	29420-43-3	0.16	0.054	0.15	0.20	ug/L	J	J	
ERFLUOROBUTANOIC ACID	375-22-4	1.6	0.055	0.15	0.20	ug/L			
ERFLUORODECANE SULFONATE	335-77-3	< 0.15	0.060	0.15	0.20	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.15	0.061	0.15	0.20	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.10	0.050	0.10	0.20	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	3.8	0.074	0.15	0.20	ug/L			
ERFLUOROHEXANE SULFONATE	108427-53-8	3.8	0.056	0.15	0.20	ug/L			
ERFLUOROHEXANOIC ACID	307-24-4	4.3	0.035	0.10	0.20	ug/L			
ERFLUORONONANOIC ACID	375-95-1	1.2	0.087	0.18	0.20	ug/L			
ERFLUOROOCTANE SULFONAMIDE	54-91-6	< 0.10	0.034	0.10	0.20	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	21	0.30	0.75	1.0	ug/L			
ERFLUOROOCTANOIC ACID	335-67-1	3.3	0.033	0.10	0.20	ug/L			
ERFLUOROPENTANOIC ACID	2706-90-3	5.2	0.075	0.18	0.20	ug/L			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.10	0.027	0.10	0.20	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.10	0.038	0.10	0.20	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.10	0.025	0.10	0.20	ug/L	U	U	

Sample Name SHAW03-F	T3MW5-GW-916		Matrix 7	Гуре: W	R	esult Typ	e: TRG		
Lab Sample Name: FZJ961	Sample	Date/Time	: 2018	-01-25	17:40		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONAT	E 27619-97-2	32	0.33	0.75	1.0	ug/L			
:2 FLUOROTELOMER SULFONAT	E 39108-34-4	4.2	0.033	0.075	0.10	ug/L			
ERFLUOROBUTANE SULFONATE	E 29420-43-3	0.12	0.027	0.075	0.10	ug/L			
ERFLUOROBUTANOIC ACID	375-22-4	1.6	0.028	0.075	0.10	ug/L			
ERFLUORODECANE SULFONATE	E 335-77-3	< 0.075	0.030	0.075	0.10	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.075	0.031	0.075	0.10	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.050	0.025	0.050	0.10	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	4.0	0.037	0.075	0.10	ug/L			
ERFLUOROHEXANE SULFONATI	E 108427-53-8	3.3	0.028	0.075	0.10	ug/L			
ERFLUOROHEXANOIC ACID	307-24-4	4.0	0.018	0.050	0.10	ug/L			
ERFLUORONONANOIC ACID	375-95-1	1.3	0.044	0.090	0.10	ug/L			
ERFLUOROOCTANE SULFONAM	IDE 754-91-6	< 0.050	0.017	0.050	0.10	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	E 1763-23-1	20	0.30	0.75	1.0	ug/L			
ERFLUOROOCTANOIC ACID	335-67-1	3.2	0.017	0.050	0.10	ug/L			
ERFLUOROPENTANOIC ACID	2706-90-3	4.9	0.19	0.45	0.50	ug/L			
ERFLUOROTETRADECANOIC AC	CID 376-06-7	< 0.050	0.014	0.050	0.10	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.050	0.019	0.050	0.10	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.050	0.013	0.050	0.10	ug/L	U	U	

Sample Name SHAW04-0	01-SO-013		Matrix T	ype: S	R	lesult Typ	e: TRG		
Lab Sample Name: FZJ951	Sampl	e Date/Time	e: 2018-0	01-26	10:35		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2 FLUOROTELOMER SULFONAT	TE 27619-97-2	0.84	0.23	0.70	0.88	ug/kg	J	1	
:2 FLUOROTELOMER SULFONAT	TE 39108-34-4	< 0.70	0.29	0.70	0.88	ug/kg	U	U	
ERFLUOROBUTANE SULFONATI	E 29420-43-3	<0.44	0.15	0.44	0.88	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	<0.44	0.20	0.44	0.88	ug/kg	U	U	
ERFLUORODECANE SULFONAT	E 335-77-3	< 0.70	0.34	0.70	0.88	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.70	0.25	0.70	0.88	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.70	0.25	0.70	0.88	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	<0.44	0.17	0.44	0.88	ug/kg	U	U	
ERFLUOROHEXANE SULFONAT	E 108427-53-8	2.4	0.21	0.44	0.88	ug/kg			
ERFLUOROHEXANOIC ACID	307-24-4	0.36	0.12	0.44	0.88	ug/kg	J	J	
ERFLUORONONANOIC ACID	375-95-1	<0.44	0.19	0.44	0.88	ug/kg	U	U	
ERFLUOROOCTANE SULFONAM	IDE 754-91-6	<0.44	0.12	0.44	0.88	ug/kg	U	U	
ERFLUOROOCTANE SULFONATI	E 1763-23-1	3.4	0.23	0.70	0.88	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	0.78	0.22	0.70	0.88	ug/kg	J	J	
ERFLUOROPENTANOIC ACID	2706-90-3	< 0.70	0.22	0.70	0.88	ug/kg	U	U	
ERFLUOROTETRADECANOIC AC	CID 376-06-7	< 0.70	0.27	0.70	0.88	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.70	0.29	0.70	0.88	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.70	0.30	0.70	0.88	ug/kg	U	U	

Sample Name SHAW04-001-	SS-001		Matrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ950	Sample	e Date/Time	e: 2018-	-01-26	10:00		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.70	0.23	0.70	0.88	ug/kg	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.70	0.29	0.70	0.88	ug/kg	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.44	0.15	0.44	0.88	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	0.92	0.20	0.44	0.88	ug/kg			
ERFLUORODECANE SULFONATE	335-77-3	< 0.70	0.34	0.70	0.88	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.70	0.25	0.70	0.88	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.70	0.25	0.70	0.88	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	0.59	0.17	0.44	0.88	ug/kg	J	J	
ERFLUOROHEXANE SULFONATE	108427-53-8	2.3	0.21	0.44	0.88	ug/kg			
ERFLUOROHEXANOIC ACID	307-24-4	1.1	0.12	0.44	0.88	ug/kg			
ERFLUORONONANOIC ACID	375-95-1	0.78	0.19	0.44	0.88	ug/kg	J	J	
ERFLUOROOCTANE SULFONAMIDE	2 754-91-6	< 0.44	0.12	0.44	0.88	ug/kg	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	27	0.23	0.70	0.88	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	0.90	0.22	0.70	0.88	ug/kg			
ERFLUOROPENTANOIC ACID	2706-90-3	1.8	0.22	0.70	0.88	ug/kg			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.70	0.27	0.70	0.88	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.70	0.29	0.70	0.88	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.70	0.30	0.70	0.88	ug/kg	U	U	

Sample Name SHAW04-002-	SO-013		Matrix T	ype: S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ948	Sample	e Date/Time	e: 2018-	01-26	09:40		Validati	on Level: St	age 4
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SULFONATE	27619-97-2	<0.71	0.23	0.71	0.89	ug/kg	U	U	
3:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.71	0.29	0.71	0.89	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	<0.45	0.15	0.45	0.89	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	<0.45	0.20	0.45	0.89	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.71	0.35	0.71	0.89	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.71	0.25	0.71	0.89	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.71	0.25	0.71	0.89	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.45	0.17	0.45	0.89	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	4.0	0.21	0.45	0.89	ug/kg		J	17
PERFLUOROHEXANOIC ACID	307-24-4	1.4	0.12	0.45	0.89	ug/kg		J	17
PERFLUORONONANOIC ACID	375-95-1	< 0.45	0.20	0.45	0.89	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	<0.45	0.12	0.45	0.89	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	1.4	0.23	0.71	0.89	ug/kg		J	17
PERFLUOROOCTANOIC ACID	335-67-1	< 0.71	0.22	0.71	0.89	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.71	0.22	0.71	0.89	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.71	0.28	0.71	0.89	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.71	0.29	0.71	0.89	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.71	0.30	0.71	0.89	ug/kg	U	U	

Sample Name SHAW04-002-S	SO-913		Matrix Ty	ype: S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ949	Sample	e Date/Time	2018-0	1-26	09:40		Validatio	on Level: St	age 4
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	0.61	0.25	0.78	0.97	ug/kg	J	J	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.78	0.32	0.78	0.97	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.49	0.16	0.49	0.97	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.49	0.22	0.49	0.97	ug/kg	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.78	0.38	0.78	0.97	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.78	0.27	0.78	0.97	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.78	0.27	0.78	0.97	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.49	0.18	0.49	0.97	ug/kg	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	1.4	0.23	0.49	0.97	ug/kg		J	17
ERFLUOROHEXANOIC ACID	307-24-4	0.26	0.14	0.49	0.97	ug/kg	J	J	17
ERFLUORONONANOIC ACID	375-95-1	< 0.49	0.21	0.49	0.97	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.49	0.14	0.49	0.97	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	11	0.25	0.78	0.97	ug/kg		J	17
PERFLUOROOCTANOIC ACID	335-67-1	< 0.78	0.24	0.78	0.97	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.78	0.24	0.78	0.97	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.78	0.30	0.78	0.97	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.78	0.32	0.78	0.97	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.78	0.33	0.78	0.97	ug/kg	U	U	

Analysis Method:	EPA 537 m								
Sample Name SHAW04-002-	-SS-001	Ν	latrix T	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ947	Sample	Date/Time:	2018-	-01-26	09:10		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.80	0.26	0.80	1.0	ug/kg	U	U	
8:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.50	0.17	0.50	1.0	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.50	0.23	0.50	1.0	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.80	0.39	0.80	1.0	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.50	0.19	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	0.44	0.24	0.50	1.0	ug/kg	J	J	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.50	0.14	0.50	1.0	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	< 0.50	0.22	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMID	E 754-91-6	< 0.50	0.14	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	6.2	0.26	0.80	1.0	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	< 0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	0.98	0.25	0.80	1.0	ug/kg	J	J	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.80	0.31	0.80	1.0	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.80	0.34	0.80	1.0	ug/kg	U	U	

SHAW04-003-	SS-001		Matrix 7	Гуре: S	R	lesult Typ	e: TRG		
e: FZJ952	Sampl	e Date/Time	e: 2018	-01-26	11:05		Validati	on Level: St	age 2B
	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
ER SULFONATE	27619-97-2	< 0.73	0.24	0.73	0.91	ug/kg	U	U	
ER SULFONATE	39108-34-4	< 0.73	0.30	0.73	0.91	ug/kg	U	U	
IE SULFONATE	29420-43-3	<0.46	0.15	0.46	0.91	ug/kg	U	U	
NOIC ACID	375-22-4	<0.46	0.21	0.46	0.91	ug/kg	U	U	
IE SULFONATE	335-77-3	< 0.73	0.35	0.73	0.91	ug/kg	U	U	
NOIC ACID	335-76-2	< 0.73	0.25	0.73	0.91	ug/kg	U	U	
CANOIC ACID	307-55-1	< 0.73	0.25	0.73	0.91	ug/kg	U	U	
NOIC ACID	375-85-9	0.33	0.17	0.46	0.91	ug/kg	J	J	
NE SULFONATE	108427-53-8	0.54	0.22	0.46	0.91	ug/kg	J	J	
NOIC ACID	307-24-4	0.26	0.13	0.46	0.91	ug/kg	J	J	
NOIC ACID	375-95-1	0.72	0.20	0.46	0.91	ug/kg	J	J	
IE SULFONAMIDE	E 754-91-6	<0.46	0.13	0.46	0.91	ug/kg	U	U	
IE SULFONATE	1763-23-1	11	0.24	0.73	0.91	ug/kg			
NOIC ACID	335-67-1	<0.73	0.23	0.73	0.91	ug/kg	U	U	
NOIC ACID	2706-90-3	0.70	0.23	0.73	0.91	ug/kg	J	J	
DECANOIC ACID	376-06-7	<0.73	0.28	0.73	0.91	ug/kg	U	U	
CANOIC ACID	72629-94-8	< 0.73	0.30	0.73	0.91	ug/kg	U	U	
CANOIC ACID	2058-94-8	< 0.73	0.31	0.73	0.91	ug/kg	U	U	
	e: FZJ952 EER SULFONATE ER SULFONATE NOIC ACID NOIC ACID NOIC ACID NOIC ACID NOIC ACID NOIC ACID NOIC ACID NOIC ACID NOIC ACID	CAS No           ER SULFONATE         27619-97-2           ER SULFONATE         39108-34-4           NE SULFONATE         29420-43-3           NOIC ACID         375-22-4           NE SULFONATE         335-77-3           NOIC ACID         335-76-2           CANOIC ACID         307-55-1           NOIC ACID         307-55-1           NOIC ACID         307-24-4           NOIC ACID         307-24-4           NOIC ACID         375-95-1           NE SULFONATE         1763-23-1           NOIC ACID         335-67-1           NOIC ACID         376-90-3           DECANOIC ACID         376-06-7           CANOIC ACID         72629-94-8	FZJ952         Sample Date/Time           CAS No         Result Value           ER SULFONATE         27619-97-2         <0.73	E:       FZJ952       Sample Date/Time:       2018         CAS No       Result Value       DL         ER SULFONATE       27619-97-2       <0.73	E:       FZJ952       Sample Date/Time:       2018-01-26         CAS No       Result Value       DL       LOD         ER SULFONATE       27619-97-2       <0.73	e:       FZJ952       Sample Date/Time:       2018-01-26       11:05         CAS No       Result Value       DL       LOD       LOQ         ER SULFONATE       27619-97-2       <0.73	e:       FZJ952       Sample Date/Time:       2018-01-26       11:05         CAS No       Result Value       DL       LOD       LOQ       Result Units         ER SULFONATE       27619-97-2       <0.73	E:       FZJ952       Sample Date/Time:       2018-01-26       11:05       Validation         CAS No       Result Value       DL       LOD       LOQ       Result Units       Lab Qualifier         ER SULFONATE       27619-97-2       <0.73	e:       FZJ952       Sample Date/Time:       2018-01-26       11:05       Validation Level:       Stress         CAS No       Result Value       DL       LOD       LOQ       Result Units       Lab       Validation Qualifier       Validation Qualifier         ER SULFONATE       27619-97-2       <0.73

Sample Name SHA	4W06-001-	GW-033	I	Matrix 7	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Name:	FZJ959	Sampl	e Date/Time	: 2018-	01-25	16:15		Validati	on Level: St	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SU	JLFONATE	27619-97-2	0.064	0.0066	0.015	0.020	ug/L			
2:2 FLUOROTELOMER SU	JLFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANE SU	LFONATE	29420-43-3	0.038	0.0054	0.015	0.020	ug/L			
PERFLUOROBUTANOIC	ACID	375-22-4	0.078	0.0055	0.015	0.020	ug/L			
PERFLUORODECANE SU	LFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANOIC	ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODECANO	IC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC	ACID	375-85-9	0.16	0.0074	0.015	0.020	ug/L			
PERFLUOROHEXANE SU	LFONATE	108427-53-8	0.43	0.0056	0.015	0.020	ug/L			
PERFLUOROHEXANOIC	ACID	307-24-4	0.20	0.0035	0.010	0.020	ug/L			
PERFLUORONONANOIC	ACID	375-95-1	0.11	0.0087	0.018	0.020	ug/L			
PERFLUOROOCTANE SU	LFONAMIDE	2 754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
PERFLUOROOCTANE SU	LFONATE	1763-23-1	0.50	0.0060	0.015	0.020	ug/L			
PERFLUOROOCTANOIC	ACID	335-67-1	0.30	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTANOIC	ACID	2706-90-3	0.22	0.0075	0.018	0.020	ug/L			
PERFLUOROTETRADECA	ANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANC	DIC ACID	72629-94-8	0.0092	0.0038	0.010	0.020	ug/L	J	J	
PERFLUOROUNDECANO	IC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Analysis Method:	EPA 537 m	l							
Sample Name SHAW06-001-	SO-028	Ν	Aatrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ940	Sample	Date/Time:	2018	-01-24	09:10		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	<1.0	0.34	1.0	1.3	ug/kg	U	U	
8:2 FLUOROTELOMER SULFONATE	39108-34-4	<1.0	0.43	1.0	1.3	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.65	0.22	0.65	1.3	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.65	0.30	0.65	1.3	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	<1.0	0.51	1.0	1.3	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	<1.0	0.36	1.0	1.3	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	<1.0	0.36	1.0	1.3	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	<0.65	0.25	0.65	1.3	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	<0.65	0.31	0.65	1.3	ug/kg	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	<0.65	0.18	0.65	1.3	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	<0.65	0.29	0.65	1.3	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	2 754-91-6	<0.65	0.18	0.65	1.3	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	0.83	0.34	1.0	1.3	ug/kg	J	J	
PERFLUOROOCTANOIC ACID	335-67-1	<1.0	0.33	1.0	1.3	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	<1.0	0.33	1.0	1.3	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	<1.0	0.40	1.0	1.3	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	<1.0	0.43	1.0	1.3	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	<1.0	0.44	1.0	1.3	ug/kg	U	U	

Sample Name SHAW06-001-	SS-001		Matrix 1	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ939	Sample	e Date/Time	e: 2018	-01-24	08:25		Validatio	on Level: Sta	age 4
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	<0.78	0.25	0.78	0.98	ug/kg	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.78	0.32	0.78	0.98	ug/kg	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.49	0.17	0.49	0.98	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.49	0.23	0.49	0.98	ug/kg	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.78	0.38	0.78	0.98	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.78	0.27	0.78	0.98	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.78	0.27	0.78	0.98	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.49	0.19	0.49	0.98	ug/kg	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.49	0.24	0.49	0.98	ug/kg	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	< 0.49	0.14	0.49	0.98	ug/kg	U	U	
ERFLUORONONANOIC ACID	375-95-1	< 0.49	0.22	0.49	0.98	ug/kg	U	U	
ERFLUOROOCTANE SULFONAMIDE	E 754-91-6	< 0.49	0.14	0.49	0.98	ug/kg	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	5.1	0.25	0.78	0.98	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	< 0.78	0.25	0.78	0.98	ug/kg	U	U	
ERFLUOROPENTANOIC ACID	2706-90-3	< 0.78	0.25	0.78	0.98	ug/kg	U	U	
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.78	0.30	0.78	0.98	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.78	0.32	0.78	0.98	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.78	0.33	0.78	0.98	ug/kg	U	U	

Sample Name SHAW06-002-0	GW-028	I	Matrix T	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZJ958	Sample	Date/Time	: 2018-	01-25	14:08		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	0.054	0.0066	0.015	0.020	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	0.027	0.0054	0.015	0.020	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	0.036	0.0055	0.015	0.020	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.071	0.0074	0.015	0.020	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	0.56	0.0056	0.015	0.020	ug/L			
PERFLUOROHEXANOIC ACID	307-24-4	0.14	0.0035	0.010	0.020	ug/L			
PERFLUORONONANOIC ACID	375-95-1	0.054	0.0087	0.018	0.020	ug/L			
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	0.21	0.0060	0.015	0.020	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	0.19	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	0.11	0.0075	0.018	0.020	ug/L			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name	SHAW06-002-	-SO-026		Matrix 1	Гуре: S	R	lesult Typ	e: TRG		
Lab Sample Name	e: FZJ937	Sampl	e Date/Time	e: 2018	-01-23	17:20		Validati	on Level: Sta	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOM	ER SULFONATE	27619-97-2	<0.88	0.29	0.88	1.1	ug/kg	U	U	
3:2 FLUOROTELOM	ER SULFONATE	39108-34-4	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROBUTAN	NE SULFONATE	29420-43-3	<0.55	0.19	0.55	1.1	ug/kg	U	U	
PERFLUOROBUTAN	NOIC ACID	375-22-4	< 0.55	0.25	0.55	1.1	ug/kg	U	U	
PERFLUORODECAN	NE SULFONATE	335-77-3	< 0.88	0.43	0.88	1.1	ug/kg	U	U	
PERFLUORODECAN	NOIC ACID	335-76-2	< 0.88	0.31	0.88	1.1	ug/kg	U	U	
PERFLUORODODE	CANOIC ACID	307-55-1	< 0.88	0.31	0.88	1.1	ug/kg	U	U	
PERFLUOROHEPTA	NOIC ACID	375-85-9	< 0.55	0.21	0.55	1.1	ug/kg	U	U	
PERFLUOROHEXAN	NE SULFONATE	108427-53-8	< 0.55	0.26	0.55	1.1	ug/kg	U	U	
PERFLUOROHEXAN	NOIC ACID	307-24-4	< 0.55	0.15	0.55	1.1	ug/kg	U	U	
PERFLUORONONA	NOIC ACID	375-95-1	<0.55	0.24	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTAN	NE SULFONAMIDE	E 754-91-6	<0.55	0.15	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTAN	NE SULFONATE	1763-23-1	1.0	0.29	0.88	1.1	ug/kg	J	J	
PERFLUOROOCTAN	NOIC ACID	335-67-1	< 0.88	0.28	0.88	1.1	ug/kg	U	U	
PERFLUOROPENTA	NOIC ACID	2706-90-3	< 0.88	0.28	0.88	1.1	ug/kg	U	U	
PERFLUOROTETRA	DECANOIC ACID	376-06-7	< 0.88	0.34	0.88	1.1	ug/kg	U	U	
PERFLUOROTRIDE	CANOIC ACID	72629-94-8	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROUNDE	CANOIC ACID	2058-94-8	< 0.88	0.37	0.88	1.1	ug/kg	U	U	

Analysis Method:	EPA 537 m	l							
Sample Name SHAW06-002	-SS-001	Ν	latrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ936	Sample	Date/Time:	2018-	-01-23	16:30		Validatio	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.80	0.26	0.80	1.0	ug/kg	U	U	
8:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.50	0.17	0.50	1.0	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.50	0.23	0.50	1.0	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.80	0.39	0.80	1.0	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	0.62	0.28	0.80	1.0	ug/kg	J	J	
PERFLUORODODECANOIC ACID	307-55-1	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.39	0.19	0.50	1.0	ug/kg	J	J	
PERFLUOROHEXANE SULFONATE	108427-53-8	2.3	0.24	0.50	1.0	ug/kg			
PERFLUOROHEXANOIC ACID	307-24-4	1.1	0.14	0.50	1.0	ug/kg			
PERFLUORONONANOIC ACID	375-95-1	< 0.50	0.22	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMID	E 754-91-6	4.6	0.14	0.50	1.0	ug/kg			
PERFLUOROOCTANE SULFONATE	1763-23-1	45	2.8	8.0	10	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	1.5	0.25	0.80	1.0	ug/kg			
PERFLUOROPENTANOIC ACID	2706-90-3	<0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	<0.80	0.31	0.80	1.0	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	2.0	0.33	0.80	1.0	ug/kg			
PERFLUOROUNDECANOIC ACID	2058-94-8	1.0	0.34	0.80	1.0	ug/kg			

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Sample Name	SHAW06-003-	GW-027		Matrix 7	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Nam	e: FZJ957	Sampl	e Date/Time	2018-	01-25	13:55		Validati	on Level: St	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
5:2 FLUOROTELOM	IER SULFONATE	27619-97-2	0.050	0.0066	0.015	0.020	ug/L			
:2 FLUOROTELOM	ER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTAN	NE SULFONATE	29420-43-3	0.064	0.0054	0.015	0.020	ug/L			
PERFLUOROBUTAN	NOIC ACID	375-22-4	0.065	0.0055	0.015	0.020	ug/L			
PERFLUORODECAN	NE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECAN	NOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODE	CANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTA	NOIC ACID	375-85-9	0.097	0.0074	0.015	0.020	ug/L			
PERFLUOROHEXA	NE SULFONATE	108427-53-8	0.41	0.0056	0.015	0.020	ug/L			
PERFLUOROHEXA	NOIC ACID	307-24-4	0.15	0.0035	0.010	0.020	ug/L			
PERFLUORONONA	NOIC ACID	375-95-1	0.066	0.0087	0.018	0.020	ug/L			
PERFLUOROOCTAN	NE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
PERFLUOROOCTAN	NE SULFONATE	1763-23-1	0.30	0.0060	0.015	0.020	ug/L			
PERFLUOROOCTAN	NOIC ACID	335-67-1	0.18	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTA	NOIC ACID	2706-90-3	0.15	0.0075	0.018	0.020	ug/L			
PERFLUOROTETRA	DECANOIC ACID	376-06-7	< 0.013	0.0034	0.013	0.025	ug/L	U	U	
PERFLUOROTRIDE	CANOIC ACID	72629-94-8	< 0.013	0.0048	0.013	0.025	ug/L	U	U	
PERFLUOROUNDE	CANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Analysis Method:	EPA 537 m								
Sample Name SHAW06-003-S	SO-026	Ν	Aatrix T	Type: S	R	esult Typ	e: TRG		
Lab Sample Name: FZJ935	Sample	Date/Time:	2018-	01-23	16:05		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.96	0.31	0.96	1.2	ug/kg	U	U	
8:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.96	0.40	0.96	1.2	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.60	0.20	0.60	1.2	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.60	0.28	0.60	1.2	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.96	0.47	0.96	1.2	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.96	0.34	0.96	1.2	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.96	0.34	0.96	1.2	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.60	0.23	0.60	1.2	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	<0.60	0.29	0.60	1.2	ug/kg	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.60	0.17	0.60	1.2	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	<0.60	0.26	0.60	1.2	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.60	0.17	0.60	1.2	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	< 0.96	0.31	0.96	1.2	ug/kg	U	U	
PERFLUOROOCTANOIC ACID	335-67-1	< 0.96	0.30	0.96	1.2	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.96	0.30	0.96	1.2	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.96	0.37	0.96	1.2	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.96	0.40	0.96	1.2	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	<0.96	0.41	0.96	1.2	ug/kg	U	U	

Sample Name SHA	W06-003-8	SS-001		Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name:	FZJ933	Sampl	e Date/Time	e: 2018-	-01-23	14:55		Validatio	on Level: Sta	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SUI	LFONATE	27619-97-2	< 0.88	0.29	0.88	1.1	ug/kg	U	U	
:2 FLUOROTELOMER SUI	LFONATE	39108-34-4	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROBUTANE SUL	FONATE	29420-43-3	<0.55	0.19	0.55	1.1	ug/kg	U	U	
PERFLUOROBUTANOIC A	CID	375-22-4	<0.55	0.25	0.55	1.1	ug/kg	U	U	
PERFLUORODECANE SUL	FONATE	335-77-3	0.81	0.43	0.88	1.1	ug/kg	J	J	
PERFLUORODECANOIC A	CID	335-76-2	0.97	0.31	0.88	1.1	ug/kg	J	J	
PERFLUORODODECANOI	CACID	307-55-1	< 0.88	0.31	0.88	1.1	ug/kg	U	U	
PERFLUOROHEPTANOIC A	ACID	375-85-9	0.38	0.21	0.55	1.1	ug/kg	J	J	
PERFLUOROHEXANE SUL	FONATE	108427-53-8	1.4	0.26	0.55	1.1	ug/kg			
PERFLUOROHEXANOIC A	CID	307-24-4	0.62	0.15	0.55	1.1	ug/kg	J	J	
PERFLUORONONANOIC A	CID	375-95-1	0.71	0.24	0.55	1.1	ug/kg	J	J	
PERFLUOROOCTANE SUL	FONAMIDE	754-91-6	< 0.55	0.15	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTANE SUL	FONATE	1763-23-1	33	0.29	0.88	1.1	ug/kg			
PERFLUOROOCTANOIC A	CID	335-67-1	1.4	0.28	0.88	1.1	ug/kg			
PERFLUOROPENTANOIC A	ACID	2706-90-3	< 0.88	0.28	0.88	1.1	ug/kg	U	U	
PERFLUOROTETRADECAN	NOIC ACID	376-06-7	< 0.88	0.34	0.88	1.1	ug/kg	U	U	
PERFLUOROTRIDECANO	C ACID	72629-94-8	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROUNDECANOI	C ACID	2058-94-8	< 0.88	0.37	0.88	1.1	ug/kg	U	U	

Sample Name SHAW-	RS-001	1	Matrix T	ype: W	R	esult Typ	e: TRG		
Lab Sample Name: FZJ	934 Sam	ple Date/Time	: 2018-	01-23	15:35		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2 FLUOROTELOMER SULFO	NATE 27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
:2 FLUOROTELOMER SULFO	NATE 39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANE SULFON	NATE 29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.015	0.0055	0.015	0.020	ug/L	U	U	
PERFLUORODECANE SULFON	NATE 335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODECANOIC AC	CID 307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC ACII	D 375-85-9	< 0.015	0.0074	0.015	0.020	ug/L	U	U	
PERFLUOROHEXANE SULFON	NATE 108427-53-8	< 0.015	0.0056	0.015	0.020	ug/L	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.010	0.0035	0.010	0.020	ug/L	U	U	
PERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
PERFLUOROOCTANE SULFON	VAMIDE 754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
PERFLUOROOCTANE SULFON	NATE 1763-23-1	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUOROOCTANOIC ACID	335-67-1	< 0.010	0.0033	0.010	0.020	ug/L	U	U	
PERFLUOROPENTANOIC ACII	D 2706-90-3	< 0.018	0.0075	0.018	0.020	ug/L	U	U	
PERFLUOROTETRADECANOI	C ACID 376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANOIC A	CID 72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDECANOIC AC	CID 2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name SHAW-RS-002	2	]	Matrix T	ype: W	R	Result Type: TRG					
Lab Sample Name: FZJ938	Sample	e Date/Time	: 2018-	01-24	08:10		Validatio	on Level: St	age 2B		
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code		
:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U			
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U			
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U			
ERFLUOROBUTANOIC ACID	375-22-4	< 0.015	0.0055	0.015	0.020	ug/L	U	U			
ERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U			
ERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U			
ERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U			
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.015	0.0074	0.015	0.020	ug/L	U	U			
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.015	0.0056	0.015	0.020	ug/L	U	U			
ERFLUOROHEXANOIC ACID	307-24-4	< 0.010	0.0035	0.010	0.020	ug/L	U	U			
ERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U			
ERFLUOROOCTANE SULFONAMIDE	E 754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U			
ERFLUOROOCTANE SULFONATE	1763-23-1	< 0.015	0.0060	0.015	0.020	ug/L	U	U			
ERFLUOROOCTANOIC ACID	335-67-1	< 0.010	0.0033	0.010	0.020	ug/L	U	U			
ERFLUOROPENTANOIC ACID	2706-90-3	< 0.018	0.0075	0.018	0.020	ug/L	U	U			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U			
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U			
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U			

Sample Name SHAW-RS-003	3	]	Matrix T	ype: W	R	esult Typ	e: TRG		
Lab Sample Name: FZJ942	Sample	Date/Time	: 2018-	01-25	08:55		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.015	0.0055	0.015	0.020	ug/L	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.015	0.0074	0.015	0.020	ug/L	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.015	0.0056	0.015	0.020	ug/L	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	< 0.010	0.0035	0.010	0.020	ug/L	U	U	
ERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONAMIDE	E 754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUOROOCTANOIC ACID	335-67-1	< 0.010	0.0033	0.010	0.020	ug/L	U	U	
ERFLUOROPENTANOIC ACID	2706-90-3	< 0.018	0.0075	0.018	0.020	ug/L	U	U	
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name SHAW-RS-004		I	Matrix T	ype: W	R	esult Typ	e: TRG		
Lab Sample Name: FZJ946	Sample	Date/Time	: 2018-	01-26	08:55		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.015	0.0055	0.015	0.020	ug/L	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.015	0.0074	0.015	0.020	ug/L	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.015	0.0056	0.015	0.020	ug/L	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	< 0.010	0.0035	0.010	0.020	ug/L	U	U	
ERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUOROOCTANOIC ACID	335-67-1	< 0.010	0.0033	0.010	0.020	ug/L	U	U	
ERFLUOROPENTANOIC ACID	2706-90-3	< 0.018	0.0075	0.018	0.020	ug/L	U	U	
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Analysis Method:	EPA 537 m	l							
Sample Name SHAW-SB-001		Ν	Aatrix T	Г <b>уре:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZJ941	Sample	Date/Time:	ate/Time: 2018-0		08:55		Validation Level: Stage 2B		
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	0.64	0.066	0.15	0.20	ug/L			
8:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	0.018	0.0055	0.015	0.020	ug/L	J	J	
PERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.0094	0.0074	0.015	0.020	ug/L	J	J	
PERFLUOROHEXANE SULFONATE	108427-53-8	0.011	0.0056	0.015	0.020	ug/L	J	J	
PERFLUOROHEXANOIC ACID	307-24-4	0.27	0.0035	0.010	0.020	ug/L			
PERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
PERFLUOROOCTANE SULFONAMIDE	2 754-91-6	0.016	0.0034	0.010	0.020	ug/L	J	J	
PERFLUOROOCTANE SULFONATE	1763-23-1	0.84	0.060	0.15	0.20	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	0.0056	0.0033	0.010	0.020	ug/L	J	J	
PERFLUOROPENTANOIC ACID	2706-90-3	0.016	0.0075	0.015	0.020	ug/L	J	J	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

M2032.0001

Tuesday, March 13, 2018

# Validated Sample Result Forms: B823124

Sample Name SHAW01-001-S	SO-002		Matrix '	Гуре: S	R	lesult Typ	e: TRG			
Lab Sample Name: FZY521	Sampl	e Date/Time	2018	-01-26	16:30		Validatio	on Level: St	age 2B	
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code	
5:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.78	0.25	0.78	0.97	ug/kg	U	U		
3:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.78	0.32	0.78	0.97	ug/kg	U	U		
PERFLUOROBUTANE SULFONATE	29420-43-3	<0.49	0.16	0.49	0.97	ug/kg	U	U		
PERFLUOROBUTANOIC ACID	375-22-4	< 0.49	0.22	0.49	0.97	ug/kg	U	U		
PERFLUORODECANE SULFONATE	335-77-3	1.5	0.35	0.73	0.91	ug/kg				
PERFLUORODECANOIC ACID	335-76-2	< 0.73	0.25	0.73	0.91	ug/kg	U	U		
PERFLUORODODECANOIC ACID	307-55-1	< 0.73	0.25	0.73	0.91	ug/kg	U	U		
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.46	0.17	0.46	0.91	ug/kg	U	U		
PERFLUOROHEXANE SULFONATE	108427-53-8	11	0.23	0.49	0.97	ug/kg		J	17	
PERFLUOROHEXANE SULFONATE	108427-53-8	10	0.22		0.91	ug/kg		Х	16	
PERFLUOROHEXANOIC ACID	307-24-4	1.7	0.14	0.49	0.97	ug/kg				
PERFLUORONONANOIC ACID	375-95-1	<0.46	0.20	0.46	0.91	ug/kg	U	U		
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.49	0.14	0.49	0.97	ug/kg	U	U		
PERFLUOROOCTANE SULFONATE	1763-23-1	960	24	73	91	ug/kg		J	17	
PERFLUOROOCTANOIC ACID	335-67-1	2.3	0.24	0.78	0.97	ug/kg		J	17	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.73	0.23	0.73	0.91	ug/kg	U	U		
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.74	0.29	0.74	0.92	ug/kg	U	UJ	10A	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.74	0.30	0.74	0.92	ug/kg	U	UJ	10A	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.78	0.33	0.78	0.97	ug/kg	U	U		

Sample Name SHAW0	1-001-SO-902		Matrix T	ype: S	R	lesult Typ	e: TRG		
Lab Sample Name: FZY	522	Sample Date/Tim	<b>e:</b> 2018-0	1-26	16:30		Validati	on Level: St	age 2B
Analyte	CAS N	o Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2 FLUOROTELOMER SULFO	NATE 27619-9	<0.96	0.31	0.96	1.2	ug/kg	U	U	
:2 FLUOROTELOMER SULFO	NATE 39108-3	4-4 <0.96	0.40	0.96	1.2	ug/kg	U	U	
PERFLUOROBUTANE SULFON	ATE 29420-4	-3-3 <0.60	0.20	0.60	1.2	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	4 <0.60	0.28	0.60	1.2	ug/kg	U	U	
PERFLUORODECANE SULFON	IATE 335-77-3	3 <0.96	0.47	0.96	1.2	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	2 <0.96	0.34	0.96	1.2	ug/kg	U	U	
PERFLUORODODECANOIC AC	CID 307-55-	1 <0.96	0.34	0.96	1.2	ug/kg	U	U	
PERFLUOROHEPTANOIC ACIE	375-85-9	9 <0.60	0.23	0.60	1.2	ug/kg	U	U	
PERFLUOROHEXANE SULFON	IATE 108427-	53-8 7.9	0.29	0.60	1.2	ug/kg		J	17
PERFLUOROHEXANOIC ACID	307-24-4	4 0.96	0.17	0.60	1.2	ug/kg	J	JB	06C
PERFLUORONONANOIC ACID	375-95-	1 <0.60	0.26	0.60	1.2	ug/kg	U	U	
PERFLUOROOCTANE SULFON	AMIDE 754-91-0	6 <0.60	0.17	0.60	1.2	ug/kg	U	U	
PERFLUOROOCTANE SULFON	IATE 1763-23	-1 280	3.1	9.6	12	ug/kg		J	17
PERFLUOROOCTANOIC ACID	335-67-	1 0.97	0.30	0.96	1.2	ug/kg	J	J	17
PERFLUOROPENTANOIC ACIE	2706-90	-3 <0.96	0.30	0.96	1.2	ug/kg	U	U	
PERFLUOROTETRADECANOIO	CACID 376-06-	7 <0.80	0.31	0.80	1.0	ug/kg	U	U	
PERFLUOROTRIDECANOIC AC	CID 72629-9	4-8 <0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROUNDECANOIC AC	CID 2058-94	-8 <0.96	0.41	0.96	1.2	ug/kg	U	U	

Sample Name SHAW01-001-	-SS-001		Matrix 1	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY519	Sample	e Date/Time	2018	-01-26	16:20		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.77	0.25	0.77	0.96	ug/kg	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.77	0.32	0.77	0.96	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	<0.48	0.16	0.48	0.96	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	<0.48	0.22	0.48	0.96	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	31	0.43	0.88	1.1	ug/kg		J	17
PERFLUORODECANOIC ACID	335-76-2	0.97	0.31	0.88	1.1	ug/kg	J	J	
PERFLUORODODECANOIC ACID	307-55-1	< 0.88	0.31	0.88	1.1	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.45	0.21	0.55	1.1	ug/kg	J	J	
PERFLUOROHEXANE SULFONATE	108427-53-8	39	0.23	0.48	0.96	ug/kg			
PERFLUOROHEXANOIC ACID	307-24-4	3.9	0.13	0.48	0.96	ug/kg		J	17
PERFLUORONONANOIC ACID	375-95-1	< 0.55	0.24	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	E 754-91-6	12	0.13	0.48	0.96	ug/kg			
PERFLUOROOCTANE SULFONATE	1763-23-1	360	2.9	8.8	11	ug/kg		J	17
PERFLUOROOCTANOIC ACID	335-67-1	6.8	0.24	0.77	0.96	ug/kg			
PERFLUOROPENTANOIC ACID	2706-90-3	0.51	0.28	0.88	1.1	ug/kg	J	JB	06C
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.77	0.30	0.77	0.96	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.77	0.32	0.77	0.96	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.77	0.33	0.77	0.96	ug/kg	U	U	

Sample Name SHAW01-001-S	SS-901	]	Matrix T	ype: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY520	Sample	e Date/Time	2018-0	)1-26	16:20		Validatio	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.74	0.24	0.74	0.92	ug/kg	U	U	
2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.74	0.30	0.74	0.92	ug/kg	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	<0.46	0.16	0.46	0.92	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	<0.46	0.21	0.46	0.92	ug/kg	U	U	
ERFLUORODECANE SULFONATE	335-77-3	5.7	0.36	0.74	0.92	ug/kg		J	17
ERFLUORODECANOIC ACID	335-76-2	< 0.74	0.26	0.74	0.92	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	<0.74	0.26	0.74	0.92	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	0.42	0.17	0.46	0.92	ug/kg	J	J	
ERFLUOROHEXANE SULFONATE	108427-53-8	51	2.2	4.6	9.2	ug/kg			
ERFLUOROHEXANOIC ACID	307-24-4	7.6	0.13	0.46	0.92	ug/kg		J	17
ERFLUORONONANOIC ACID	375-95-1	< 0.46	0.20	0.46	0.92	ug/kg	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	11	0.13	0.46	0.92	ug/kg			
ERFLUOROOCTANE SULFONATE	1763-23-1	140	2.4	7.4	9.2	ug/kg		J	17
ERFLUOROOCTANOIC ACID	335-67-1	5.1	0.23	0.74	0.92	ug/kg			
ERFLUOROPENTANOIC ACID	2706-90-3	1.4	0.23	0.74	0.92	ug/kg			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.74	0.29	0.74	0.92	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.74	0.30	0.74	0.92	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.74	0.31	0.74	0.92	ug/kg	U	U	

Sample Name SH	AW01-002-	SO-003		Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name:	FZY526	Sampl	e Date/Time	e: 2018	-01-26	17:15		Validatio	on Level: Sta	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER S	ULFONATE	27619-97-2	< 0.76	0.25	0.76	0.95	ug/kg	U	U	
3:2 FLUOROTELOMER S	ULFONATE	39108-34-4	< 0.76	0.31	0.76	0.95	ug/kg	U	U	
PERFLUOROBUTANE SU	JLFONATE	29420-43-3	<0.48	0.16	0.48	0.95	ug/kg	U	U	
PERFLUOROBUTANOIC	ACID	375-22-4	< 0.48	0.22	0.48	0.95	ug/kg	U	U	
PERFLUORODECANE SU	JLFONATE	335-77-3	< 0.76	0.37	0.76	0.95	ug/kg	U	U	
PERFLUORODECANOIC	ACID	335-76-2	< 0.76	0.27	0.76	0.95	ug/kg	U	U	
PERFLUORODODECANO	DIC ACID	307-55-1	< 0.76	0.27	0.76	0.95	ug/kg	U	U	
PERFLUOROHEPTANOI	C ACID	375-85-9	< 0.48	0.18	0.48	0.95	ug/kg	U	U	
PERFLUOROHEXANE SU	JLFONATE	108427-53-8	3.0	0.23	0.48	0.95	ug/kg			
PERFLUOROHEXANOIC	ACID	307-24-4	0.71	0.13	0.48	0.95	ug/kg	J	JB	06C
PERFLUORONONANOIC	CACID	375-95-1	< 0.48	0.21	0.48	0.95	ug/kg	U	U	
PERFLUOROOCTANE SU	JLFONAMIDE	2 754-91-6	< 0.48	0.13	0.48	0.95	ug/kg	U	U	
PERFLUOROOCTANE SU	JLFONATE	1763-23-1	91	2.5	7.6	9.5	ug/kg			
PERFLUOROOCTANOIC	ACID	335-67-1	< 0.76	0.24	0.76	0.95	ug/kg	U	U	
PERFLUOROPENTANOI	C ACID	2706-90-3	< 0.76	0.24	0.76	0.95	ug/kg	U	U	
PERFLUOROTETRADEC	ANOIC ACID	376-06-7	< 0.76	0.29	0.76	0.95	ug/kg	U	U	
PERFLUOROTRIDECAN	OIC ACID	72629-94-8	< 0.76	0.31	0.76	0.95	ug/kg	U	U	
PERFLUOROUNDECAN	DIC ACID	2058-94-8	< 0.76	0.32	0.76	0.95	ug/kg	U	U	

Sample Name SHAW01-002	-SS-001		Matrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZY525	Sampl	e Date/Time	e: 2018-	-01-26	17:05		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.78	0.25	0.78	0.97	ug/kg	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.78	0.32	0.78	0.97	ug/kg	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	<0.49	0.16	0.49	0.97	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	0.88	0.22	0.49	0.97	ug/kg	J	J	
ERFLUORODECANE SULFONATE	335-77-3	9.7	0.38	0.78	0.97	ug/kg			
ERFLUORODECANOIC ACID	335-76-2	0.58	0.27	0.78	0.97	ug/kg	J	J	
ERFLUORODODECANOIC ACID	307-55-1	< 0.78	0.27	0.78	0.97	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	0.53	0.18	0.49	0.97	ug/kg	J	J	
ERFLUOROHEXANE SULFONATE	108427-53-8	38	0.23	0.49	0.97	ug/kg			
ERFLUOROHEXANOIC ACID	307-24-4	4.6	0.14	0.49	0.97	ug/kg			
ERFLUORONONANOIC ACID	375-95-1	<0.49	0.21	0.49	0.97	ug/kg	U	U	
ERFLUOROOCTANE SULFONAMID	E 754-91-6	12	0.14	0.49	0.97	ug/kg			
ERFLUOROOCTANE SULFONATE	1763-23-1	180	2.5	7.8	9.7	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	3.3	0.24	0.78	0.97	ug/kg			
ERFLUOROPENTANOIC ACID	2706-90-3	1.2	0.24	0.49	0.97	ug/kg			
ERFLUOROTETRADECANOIC ACIE	<b>)</b> 376-06-7	< 0.78	0.30	0.78	0.97	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	<0.78	0.32	0.78	0.97	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	0.74	0.33	0.78	0.97	ug/kg	J	J	

Sample Name SHAW01-	-003-SO-002		Matrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZY52	24 Sampl	le Date/Time	e: 2018-	-01-26	16:53		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SULFONA	ATE 27619-97-2	< 0.76	0.25	0.76	0.95	ug/kg	U	U	
:2 FLUOROTELOMER SULFONA	ATE 39108-34-4	< 0.76	0.31	0.76	0.95	ug/kg	U	U	
PERFLUOROBUTANE SULFONA	TE 29420-43-3	< 0.48	0.16	0.48	0.95	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	<0.48	0.22	0.48	0.95	ug/kg	U	U	
PERFLUORODECANE SULFONA	TE 335-77-3	<0.76	0.37	0.76	0.95	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	<0.76	0.27	0.76	0.95	ug/kg	U	U	
PERFLUORODODECANOIC ACII	307-55-1	< 0.76	0.27	0.76	0.95	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.48	0.18	0.48	0.95	ug/kg	U	U	
PERFLUOROHEXANE SULFONA	TE 108427-53-8	0.32	0.23	0.48	0.95	ug/kg	J	J	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.48	0.13	0.48	0.95	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	< 0.48	0.21	0.48	0.95	ug/kg	U	U	
PERFLUOROOCTANE SULFONA	MIDE 754-91-6	< 0.48	0.13	0.48	0.95	ug/kg	U	U	
PERFLUOROOCTANE SULFONA	TE 1763-23-1	64	2.5	7.6	9.5	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	< 0.76	0.24	0.76	0.95	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.76	0.24	0.76	0.95	ug/kg	U	U	
PERFLUOROTETRADECANOIC	ACID 376-06-7	< 0.76	0.29	0.76	0.95	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACI	D 72629-94-8	< 0.76	0.31	0.76	0.95	ug/kg	U	U	
PERFLUOROUNDECANOIC ACII	2058-94-8	< 0.76	0.32	0.76	0.95	ug/kg	U	U	

Sample Name SHAW01-003-S	SS-001		Matrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZY523	Sample	e Date/Time	e: 2018-	-01-26	16:45		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	<0.66	0.22	0.66	0.83	ug/kg	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	<0.66	0.27	0.66	0.83	ug/kg	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.42	0.14	0.42	0.83	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.42	0.19	0.42	0.83	ug/kg	U	U	
ERFLUORODECANE SULFONATE	335-77-3	0.76	0.32	0.66	0.83	ug/kg	J	J	
ERFLUORODECANOIC ACID	335-76-2	< 0.66	0.23	0.66	0.83	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.66	0.23	0.66	0.83	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.42	0.16	0.42	0.83	ug/kg	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.42	0.20	0.42	0.83	ug/kg	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	< 0.42	0.12	0.42	0.83	ug/kg	U	U	
ERFLUORONONANOIC ACID	375-95-1	< 0.42	0.18	0.42	0.83	ug/kg	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	4.8	0.12	0.42	0.83	ug/kg			
ERFLUOROOCTANE SULFONATE	1763-23-1	82	2.2	6.6	8.3	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	<0.66	0.21	0.66	0.83	ug/kg	U	U	
ERFLUOROPENTANOIC ACID	2706-90-3	<0.66	0.21	0.66	0.83	ug/kg	U	U	
ERFLUOROTETRADECANOIC ACID	376-06-7	<0.66	0.26	0.66	0.83	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	<0.66	0.27	0.66	0.83	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.66	0.28	0.66	0.83	ug/kg	U	U	

Sample Name	SHAW02-001-	-GW-021	1	Matrix T	ype: W	R	esult Typ	e: TRG		
Lab Sample Name	FZY550	Sampl	e Date/Time	: 2018-	01-27	17:38		Validati	on Level: St	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOM	ER SULFONATE	27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
3:2 FLUOROTELOM	ER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTAN	IE SULFONATE	29420-43-3	0.010	0.0054	0.015	0.020	ug/L	J	J	
PERFLUOROBUTAN	IOIC ACID	375-22-4	< 0.015	0.0055	0.015	0.020	ug/L	U	U	
PERFLUORODECAN	IE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECAN	IOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODEC	CANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTA	NOIC ACID	375-85-9	< 0.015	0.0074	0.015	0.020	ug/L	U	U	
PERFLUOROHEXAN	IE SULFONATE	108427-53-8	0.14	0.0056	0.015	0.020	ug/L			
PERFLUOROHEXAN	JOIC ACID	307-24-4	0.019	0.0035	0.010	0.020	ug/L	J	J	
PERFLUORONONAN	NOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
PERFLUOROOCTAN	E SULFONAMIDE	E 754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
PERFLUOROOCTAN	IE SULFONATE	1763-23-1	0.071	0.0060	0.015	0.020	ug/L			
PERFLUOROOCTAN	IOIC ACID	335-67-1	0.034	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTA	NOIC ACID	2706-90-3	< 0.018	0.0075	0.018	0.020	ug/L	U	U	
PERFLUOROTETRA	DECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDEC	CANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDEC	CANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name SHAW02-002-	GW-022	]	Matrix T	ype: W	R	esult Typ	e: TRG		
Lab Sample Name: FZY551	Sample	Date/Time	: 2018-	01-27	18:10		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	0.0084	0.0066	0.015	0.020	ug/L	J	J	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	0.038	0.0055	0.015	0.020	ug/L			
ERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	0.018	0.0074	0.015	0.020	ug/L	J	J	
ERFLUOROHEXANE SULFONATE	108427-53-8	0.13	0.0056	0.015	0.020	ug/L			
ERFLUOROHEXANOIC ACID	307-24-4	0.061	0.0035	0.010	0.020	ug/L			
ERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	0.43	0.0060	0.015	0.020	ug/L			
ERFLUOROOCTANOIC ACID	335-67-1	0.021	0.0033	0.010	0.020	ug/L			
ERFLUOROPENTANOIC ACID	2706-90-3	0.039	0.0075	0.018	0.020	ug/L			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name	SHAW02-003-0	GW-020	]	Matrix 7	Г <b>уре:</b> W	R	esult Typ	e: TRG		
Lab Sample Name	e: FZY549	Sampl	e Date/Time	: 2018-	-01-27	17:25		Validati	on Level: Sta	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOM	IER SULFONATE	27619-97-2	0.027	0.013	0.030	0.040	ug/L	J	J	
3:2 FLUOROTELOM	ER SULFONATE	39108-34-4	< 0.030	0.013	0.030	0.040	ug/L	U	U	
PERFLUOROBUTAN	NE SULFONATE	29420-43-3	0.038	0.011	0.030	0.040	ug/L	J	J	
PERFLUOROBUTAN	NOIC ACID	375-22-4	0.031	0.011	0.030	0.040	ug/L	J	J	
PERFLUORODECAN	NE SULFONATE	335-77-3	< 0.030	0.012	0.030	0.040	ug/L	U	U	
PERFLUORODECAN	NOIC ACID	335-76-2	< 0.030	0.012	0.030	0.040	ug/L	U	U	
PERFLUORODODE	CANOIC ACID	307-55-1	< 0.020	0.010	0.020	0.040	ug/L	U	U	
PERFLUOROHEPTA	NOIC ACID	375-85-9	0.032	0.015	0.030	0.040	ug/L	J	J	
PERFLUOROHEXAN	NE SULFONATE	108427-53-8	0.81	0.011	0.030	0.040	ug/L			
PERFLUOROHEXAN	NOIC ACID	307-24-4	0.29	0.0070	0.020	0.040	ug/L			
PERFLUORONONA	NOIC ACID	375-95-1	< 0.036	0.017	0.036	0.040	ug/L	U	U	
PERFLUOROOCTAN	NE SULFONAMIDE	754-91-6	< 0.020	0.0068	0.020	0.040	ug/L	U	U	
PERFLUOROOCTAN	NE SULFONATE	1763-23-1	3.4	0.12	0.30	0.40	ug/L			
PERFLUOROOCTAN	NOIC ACID	335-67-1	0.10	0.0066	0.020	0.040	ug/L			
PERFLUOROPENTA	NOIC ACID	2706-90-3	0.054	0.015	0.036	0.040	ug/L			
PERFLUOROTETRA	DECANOIC ACID	376-06-7	< 0.020	0.0054	0.020	0.040	ug/L	U	U	
PERFLUOROTRIDE	CANOIC ACID	72629-94-8	< 0.020	0.0076	0.020	0.040	ug/L	U	U	
PERFLUOROUNDE	CANOIC ACID	2058-94-8	< 0.020	0.0050	0.020	0.040	ug/L	U	U	

Sample Name SHAW03-001	-GW-018		Matrix 7	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY536	Sampl	e Date/Time	2018-	01-28	12:04		Validati	on Level: St	age 4
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	71	0.66	1.5	2.0	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	0.10	0.066	0.15	0.20	ug/L	J	J	
PERFLUOROBUTANE SULFONATE	29420-43-3	0.95	0.054	0.15	0.20	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	1.5	0.055	0.15	0.20	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.15	0.060	0.15	0.20	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.15	0.061	0.15	0.20	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.10	0.050	0.10	0.20	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	1.4	0.074	0.15	0.20	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	7.9	0.056	0.15	0.20	ug/L			
PERFLUOROHEXANOIC ACID	307-24-4	6.9	0.035	0.10	0.20	ug/L			
PERFLUORONONANOIC ACID	375-95-1	0.15	0.087	0.18	0.20	ug/L	J	J	
PERFLUOROOCTANE SULFONAMID	E 754-91-6	< 0.10	0.034	0.10	0.20	ug/L	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	14	0.60	1.5	2.0	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	1.7	0.033	0.10	0.20	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	5.0	0.075	0.18	0.20	ug/L			
PERFLUOROTETRADECANOIC ACIE	<b>D</b> 376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.10	0.025	0.10	0.20	ug/L	U	U	

Sample Name SHAW03-001-S	SO-016		Matrix 1	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY518	Sampl	e Date/Time	2018	-01-26	15:40		Validatio	on Level: St	age 4
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	53	2.5	7.7	9.6	ug/kg			
2 FLUOROTELOMER SULFONATE	39108-34-4	0.58	0.32	0.77	0.96	ug/kg	J	J	
ERFLUOROBUTANE SULFONATE	29420-43-3	0.95	0.16	0.48	0.96	ug/kg	J	J	
ERFLUOROBUTANOIC ACID	375-22-4	1.3	0.22	0.48	0.96	ug/kg			
ERFLUORODECANE SULFONATE	335-77-3	< 0.73	0.35	0.73	0.91	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.73	0.25	0.73	0.91	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.73	0.25	0.73	0.91	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	1.9	0.17	0.46	0.91	ug/kg			
ERFLUOROHEXANE SULFONATE	108427-53-8	11	0.23	0.48	0.96	ug/kg			
ERFLUOROHEXANOIC ACID	307-24-4	5.6	0.13	0.48	0.96	ug/kg			
ERFLUORONONANOIC ACID	375-95-1	0.38	0.20	0.46	0.91	ug/kg	J	J	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	0.80	0.13	0.48	0.96	ug/kg	J	J	
ERFLUOROOCTANE SULFONATE	1763-23-1	170	2.4	7.3	9.1	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	4.5	0.24	0.77	0.96	ug/kg			
ERFLUOROPENTANOIC ACID	2706-90-3	6.3	0.23	0.73	0.91	ug/kg			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.77	0.30	0.77	0.96	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.77	0.32	0.77	0.96	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.77	0.33	0.77	0.96	ug/kg	U	U	

Sample Name SHAW03-001-S	SS-001	]	Matrix	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY517	Sample	Date/Time	: 2018	-01-26	15:13		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	1.2	0.25	0.78	0.98	ug/kg			
2 FLUOROTELOMER SULFONATE	39108-34-4	18	0.32	0.78	0.98	ug/kg			
ERFLUOROBUTANE SULFONATE	29420-43-3	<0.49	0.17	0.49	0.98	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	2.2	0.23	0.49	0.98	ug/kg			
ERFLUORODECANE SULFONATE	335-77-3	21	0.38	0.78	0.98	ug/kg			
ERFLUORODECANOIC ACID	335-76-2	8.1	0.27	0.78	0.98	ug/kg			
ERFLUORODODECANOIC ACID	307-55-1	3.6	0.27	0.78	0.98	ug/kg			
ERFLUOROHEPTANOIC ACID	375-85-9	3.7	0.19	0.49	0.98	ug/kg			
ERFLUOROHEXANE SULFONATE	108427-53-8	6.8	0.24	0.49	0.98	ug/kg			
ERFLUOROHEXANOIC ACID	307-24-4	2.9	0.14	0.49	0.98	ug/kg			
ERFLUORONONANOIC ACID	375-95-1	4.5	0.22	0.49	0.98	ug/kg			
ERFLUOROOCTANE SULFONAMIDE	754-91-6	9.3	0.14	0.49	0.98	ug/kg			
ERFLUOROOCTANE SULFONATE	1763-23-1	13	0.25	0.78	0.98	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	6.6	0.25	0.78	0.98	ug/kg			
ERFLUOROPENTANOIC ACID	2706-90-3	3.7	0.25	0.78	0.98	ug/kg			
ERFLUOROTETRADECANOIC ACID	376-06-7	0.59	0.30	0.78	0.98	ug/kg	J	J	
ERFLUOROTRIDECANOIC ACID	72629-94-8	0.71	0.32	0.78	0.98	ug/kg	J	J	
ERFLUOROUNDECANOIC ACID	2058-94-8	6.6	0.33	0.78	0.98	ug/kg			

Sample Name SHAW03-002-0	GW-017	1	Matrix T	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY535	Sample	e Date/Time	: 2018-	01-28	11:22		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2 FLUOROTELOMER SULFONATE	27619-97-2	1.4	0.066	0.15	0.20	ug/L			
2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.019	0.0083	0.019	0.025	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	0.18	0.0068	0.019	0.025	ug/L			
ERFLUOROBUTANOIC ACID	375-22-4	0.13	0.0069	0.019	0.025	ug/L			
ERFLUORODECANE SULFONATE	335-77-3	< 0.019	0.0075	0.019	0.025	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.019	0.0076	0.019	0.025	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.013	0.0063	0.013	0.025	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	0.20	0.0093	0.019	0.025	ug/L			
ERFLUOROHEXANE SULFONATE	108427-53-8	1.4	0.056	0.15	0.20	ug/L			
ERFLUOROHEXANOIC ACID	307-24-4	0.82	0.0044	0.013	0.025	ug/L			
ERFLUORONONANOIC ACID	375-95-1	< 0.023	0.011	0.023	0.025	ug/L	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.013	0.0043	0.013	0.025	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	0.64	0.0075	0.019	0.025	ug/L			
ERFLUOROOCTANOIC ACID	335-67-1	0.17	0.0041	0.013	0.025	ug/L			
ERFLUOROPENTANOIC ACID	2706-90-3	0.46	0.0094	0.023	0.025	ug/L			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.011	0.0030	0.011	0.022	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.011	0.0042	0.011	0.022	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.013	0.0031	0.013	0.025	ug/L	U	U	

Sample Name SHAW03-002-S	SO-017		Matrix T	ype: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY514	Sample	e Date/Time	2018-	01-26	14:20		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	2.6	0.26	0.79	0.99	ug/kg			
2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.79	0.33	0.79	0.99	ug/kg	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.50	0.17	0.50	0.99	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.50	0.23	0.50	0.99	ug/kg	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.79	0.39	0.79	0.99	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.79	0.28	0.79	0.99	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.79	0.28	0.79	0.99	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.50	0.19	0.50	0.99	ug/kg	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	1.3	0.24	0.50	0.99	ug/kg			
ERFLUOROHEXANOIC ACID	307-24-4	0.97	0.14	0.50	0.99	ug/kg	J	JB	06C
ERFLUORONONANOIC ACID	375-95-1	< 0.50	0.22	0.50	0.99	ug/kg	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.50	0.14	0.50	0.99	ug/kg	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	0.96	0.26	0.79	0.99	ug/kg	J	J	
ERFLUOROOCTANOIC ACID	335-67-1	< 0.79	0.25	0.79	0.99	ug/kg	U	U	
ERFLUOROPENTANOIC ACID	2706-90-3	0.35	0.25	0.79	0.99	ug/kg	J	JB	06C
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.79	0.31	0.79	0.99	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.79	0.33	0.79	0.99	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.79	0.34	0.79	0.99	ug/kg	U	U	

Sample Name SHAW03-00	)2-SS-001	]	Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY513	Sampl	e Date/Time	2018	-01-26	13:48		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONAT	E 27619-97-2	39	0.27	0.83	1.0	ug/kg			
:2 FLUOROTELOMER SULFONAT	E 39108-34-4	1600	34	83	100	ug/kg			
PERFLUOROBUTANE SULFONATE	29420-43-3	0.48	0.18	0.52	1.0	ug/kg	J	J	
PERFLUOROBUTANOIC ACID	375-22-4	1.9	0.24	0.52	1.0	ug/kg			
PERFLUORODECANE SULFONATE	335-77-3	<7.5	3.7	7.5	9.4	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	6.0	2.6	7.5	9.4	ug/kg	J	J	
PERFLUORODODECANOIC ACID	307-55-1	<7.5	2.6	7.5	9.4	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	<4.7	1.8	4.7	9.4	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	E 108427-53-8	19	0.25	0.52	1.0	ug/kg			
PERFLUOROHEXANOIC ACID	307-24-4	4.4	0.15	0.52	1.0	ug/kg			
PERFLUORONONANOIC ACID	375-95-1	14	2.1	4.7	9.4	ug/kg			
PERFLUOROOCTANE SULFONAMI	DE 754-91-6	6.7	0.15	0.52	1.0	ug/kg			
PERFLUOROOCTANE SULFONATE	1763-23-1	740	24	75	94	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	12	0.26	0.83	1.0	ug/kg			
PERFLUOROPENTANOIC ACID	2706-90-3	5.9	2.4	7.5	9.4	ug/kg	J	JB	06C
PERFLUOROTETRADECANOIC AC	ID 376-06-7	< 0.83	0.32	0.83	1.0	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.83	0.34	0.83	1.0	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.83	0.35	0.83	1.0	ug/kg	U	U	

Sample Name SHAW03-003-0	GW-018	I	Matrix 7	Г <b>уре:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY553	Sampl	e Date/Time	: 2018	-01-28	11:45		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	210	2.0	5.0	8.0	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	<1.5	0.66	1.5	2.0	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	18	0.54	1.5	2.0	ug/L			
ERFLUOROBUTANOIC ACID	375-22-4	9.6	0.55	1.5	2.0	ug/L			
ERFLUORODECANE SULFONATE	335-77-3	<1.5	0.60	1.5	2.0	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	<1.5	0.61	1.5	2.0	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	<1.0	0.50	1.0	2.0	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	7.9	0.74	1.5	2.0	ug/L			
ERFLUOROHEXANE SULFONATE	108427-53-8	100	2.4	5.0	8.0	ug/L			
ERFLUOROHEXANOIC ACID	307-24-4	56	0.35	1.0	2.0	ug/L			
ERFLUORONONANOIC ACID	375-95-1	<1.8	0.87	1.8	2.0	ug/L	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	<1.0	0.34	1.0	2.0	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	30	0.60	1.5	2.0	ug/L			
ERFLUOROOCTANOIC ACID	335-67-1	13	0.33	1.0	2.0	ug/L			
ERFLUOROPENTANOIC ACID	2706-90-3	24	0.75	1.8	2.0	ug/L			
ERFLUOROTETRADECANOIC ACID	376-06-7	<1.0	0.27	1.0	2.0	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	<1.0	0.38	1.0	2.0	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	<1.0	0.25	1.0	2.0	ug/L	U	U	

Sample Name SHAW03-003-S	SO-016	I	Matrix 1	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY516	Sampl	e Date/Time	: 2018	-01-26	15:00		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	250	2.9	8.8	11	ug/kg			
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	8.3	0.19	0.55	1.1	ug/kg			
PERFLUOROBUTANOIC ACID	375-22-4	5.8	0.25	0.55	1.1	ug/kg			
PERFLUORODECANE SULFONATE	335-77-3	< 0.85	0.41	0.85	1.1	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.85	0.30	0.85	1.1	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.85	0.30	0.85	1.1	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	5.0	0.20	0.53	1.1	ug/kg			
PERFLUOROHEXANE SULFONATE	108427-53-8	67	2.6	5.5	11	ug/kg			
PERFLUOROHEXANOIC ACID	307-24-4	27	0.15	0.55	1.1	ug/kg			
PERFLUORONONANOIC ACID	375-95-1	< 0.53	0.23	0.53	1.1	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.55	0.15	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	200	2.6	8.5	11	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	19	0.28	0.88	1.1	ug/kg			
PERFLUOROPENTANOIC ACID	2706-90-3	17	0.27	0.85	1.1	ug/kg			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.88	0.34	0.88	1.1	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.88	0.37	0.88	1.1	ug/kg	U	U	

Sample Name SHAW03-003-S	SS-001		Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY515	Sample	e Date/Time	e: 2018-	-01-26	14:35		Validatio	on Level: Sta	age 2B
analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2 FLUOROTELOMER SULFONATE	27619-97-2	0.93	0.23	0.70	0.87	ug/kg			
2 FLUOROTELOMER SULFONATE	39108-34-4	0.69	0.29	0.70	0.87	ug/kg	J	J	
ERFLUOROBUTANE SULFONATE	29420-43-3	<0.44	0.15	0.44	0.87	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	1.3	0.20	0.44	0.87	ug/kg			
ERFLUORODECANE SULFONATE	335-77-3	3.2	0.37	0.76	0.95	ug/kg			
ERFLUORODECANOIC ACID	335-76-2	2.4	0.27	0.76	0.95	ug/kg			
ERFLUORODODECANOIC ACID	307-55-1	1.0	0.27	0.76	0.95	ug/kg			
ERFLUOROHEPTANOIC ACID	375-85-9	1.2	0.18	0.48	0.95	ug/kg			
ERFLUOROHEXANE SULFONATE	108427-53-8	5.5	0.21	0.44	0.87	ug/kg			
ERFLUOROHEXANOIC ACID	307-24-4	2.0	0.12	0.44	0.87	ug/kg			
ERFLUORONONANOIC ACID	375-95-1	2.1	0.21	0.48	0.95	ug/kg			
ERFLUOROOCTANE SULFONAMIDE	754-91-6	1.2	0.12	0.44	0.87	ug/kg			
ERFLUOROOCTANE SULFONATE	1763-23-1	47	2.5	7.6	9.5	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	4.1	0.22	0.70	0.87	ug/kg			
ERFLUOROPENTANOIC ACID	2706-90-3	3.3	0.24	0.76	0.95	ug/kg			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.70	0.27	0.70	0.87	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	0.42	0.29	0.70	0.87	ug/kg	J	J	
ERFLUOROUNDECANOIC ACID	2058-94-8	1.6	0.30	0.70	0.87	ug/kg			

Sample Name SHAW04-001-0	GW-018	I	Matrix 7	Г <b>уре:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY554	Sample	Date/Time	: 2018-	-01-28	15:10		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	1.1	0.033	0.075	0.10	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	0.047	0.033	0.075	0.10	ug/L	J	J	
PERFLUOROBUTANE SULFONATE	29420-43-3	0.26	0.027	0.075	0.10	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	0.32	0.028	0.075	0.10	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.075	0.030	0.075	0.10	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.075	0.031	0.075	0.10	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.050	0.025	0.050	0.10	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.37	0.037	0.075	0.10	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	12	0.28	0.75	1.0	ug/L			
PERFLUOROHEXANOIC ACID	307-24-4	2.2	0.018	0.050	0.10	ug/L			
PERFLUORONONANOIC ACID	375-95-1	0.051	0.044	0.090	0.10	ug/L	J	J	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.050	0.017	0.050	0.10	ug/L	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	4.2	0.030	0.075	0.10	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	4.7	0.017	0.050	0.10	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	0.92	0.038	0.090	0.10	ug/L			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.050	0.014	0.050	0.10	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.050	0.019	0.050	0.10	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.050	0.013	0.050	0.10	ug/L	U	U	

Sample Name SHAW04-002-0	GW-018	]	Matrix 7	Г <b>уре:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY552	Sample	e Date/Time	: 2018	-01-28	10:35		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	0.39	0.033	0.075	0.10	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	0.077	0.033	0.075	0.10	ug/L	J	J	
PERFLUOROBUTANE SULFONATE	29420-43-3	0.30	0.027	0.075	0.10	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	0.34	0.028	0.075	0.10	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.075	0.030	0.075	0.10	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.075	0.031	0.075	0.10	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.050	0.025	0.050	0.10	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.51	0.037	0.075	0.10	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	16	0.28	0.75	1.0	ug/L			
PERFLUOROHEXANOIC ACID	307-24-4	5.8	0.18	0.50	1.0	ug/L			
PERFLUORONONANOIC ACID	375-95-1	0.053	0.044	0.090	0.10	ug/L	J	J	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.050	0.017	0.050	0.10	ug/L	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	3.9	0.030	0.075	0.10	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	1.2	0.017	0.050	0.10	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	1.1	0.038	0.090	0.10	ug/L			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.050	0.014	0.050	0.10	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.050	0.019	0.050	0.10	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.050	0.013	0.050	0.10	ug/L	U	U	

Sample Name SHAW04-003-	GW-015	1	Matrix 7	Г <b>уре:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY534	Sample	e Date/Time	: 2018-	-01-28	10:10		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	0.31	0.013	0.030	0.040	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	0.13	0.013	0.030	0.040	ug/L			
PERFLUOROBUTANE SULFONATE	29420-43-3	0.098	0.011	0.030	0.040	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	0.11	0.011	0.030	0.040	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.030	0.012	0.030	0.040	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.030	0.012	0.030	0.040	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.020	0.010	0.020	0.040	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.16	0.015	0.030	0.040	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	5.2	0.11	0.30	0.40	ug/L			
PERFLUOROHEXANOIC ACID	307-24-4	1.2	0.0070	0.020	0.040	ug/L			
PERFLUORONONANOIC ACID	375-95-1	0.024	0.017	0.036	0.040	ug/L	J	J	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.020	0.0068	0.020	0.040	ug/L	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	7.9	0.12	0.30	0.40	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	0.60	0.0066	0.020	0.040	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	0.31	0.015	0.036	0.040	ug/L			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.20	0.054	0.20	0.40	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.20	0.076	0.20	0.40	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.020	0.0050	0.020	0.040	ug/L	U	U	

Sample Name SHAW04-00	3-SO-012		Matrix T	ype: S	R	lesult Typ	e: TRG		
Lab Sample Name: FZY512	Sampl	e Date/Time	e: 2018-0	01-26	12:15		Validati	on Level: St	age 4
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2 FLUOROTELOMER SULFONATE	E 27619-97-2	0.84	0.25	0.78	0.97	ug/kg	J	JB	06C
:2 FLUOROTELOMER SULFONATE	E 39108-34-4	0.57	0.32	0.78	0.97	ug/kg	J	J	
PERFLUOROBUTANE SULFONATE	29420-43-3	<0.49	0.16	0.49	0.97	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	<0.49	0.22	0.49	0.97	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.80	0.39	0.80	1.0	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.50	0.19	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	0.85	0.23	0.49	0.97	ug/kg	J	J	
PERFLUOROHEXANOIC ACID	307-24-4	0.47	0.14	0.49	0.97	ug/kg	J	JB	06C
PERFLUORONONANOIC ACID	375-95-1	< 0.50	0.22	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMI	DE 754-91-6	<0.49	0.14	0.49	0.97	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	6.3	0.26	0.80	1.0	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	< 0.78	0.24	0.78	0.97	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROTETRADECANOIC AC	ID 376-06-7	< 0.78	0.30	0.78	0.97	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.78	0.32	0.78	0.97	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.78	0.33	0.78	0.97	ug/kg	U	U	

Analvsis Method:	EPA 537 m								
Sample Name SHAW04-004-	-SD-001	Ν	1atrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZY543	Sample	Date/Time:	2018-	-01-27	12:04		Validatio	on Level: Sta	age 4
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	2.8	0.26	0.80	1.0	ug/kg		J	17
8:2 FLUOROTELOMER SULFONATE	39108-34-4	3.4	0.33	0.80	1.0	ug/kg		J	17
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.50	0.17	0.50	1.0	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.50	0.23	0.50	1.0	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	1.0	0.39	0.80	1.0	ug/kg		J	17
PERFLUORODECANOIC ACID	335-76-2	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	0.73	0.28	0.80	1.0	ug/kg	J	J	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.50	0.19	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	0.69	0.24	0.50	1.0	ug/kg	J	J	
PERFLUOROHEXANOIC ACID	307-24-4	0.60	0.14	0.50	1.0	ug/kg	J	JB	06C
PERFLUORONONANOIC ACID	375-95-1	< 0.50	0.22	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	E 754-91-6	1.6	0.14	0.50	1.0	ug/kg		J	17
PERFLUOROOCTANE SULFONATE	1763-23-1	26	0.26	0.80	1.0	ug/kg		J	17
PERFLUOROOCTANOIC ACID	335-67-1	0.40	0.25	0.80	1.0	ug/kg	J	J	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.80	0.31	0.80	1.0	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.80	0.34	0.80	1.0	ug/kg	U	U	

Sample Name	SHAW04-004-	SD-901		Matrix	Гуре: S	R	lesult Typ	e: TRG		
Lab Sample Name	e: FZY544	Sampl	e Date/Time	e: 2018	-01-27	12:04		Validatio	on Level: St	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOM	ER SULFONATE	27619-97-2	5.2	0.36	1.1	1.4	ug/kg		J	17
3:2 FLUOROTELOM	ER SULFONATE	39108-34-4	5.0	0.46	1.1	1.4	ug/kg		J	17
PERFLUOROBUTAN	NE SULFONATE	29420-43-3	< 0.70	0.24	0.70	1.4	ug/kg	U	U	
PERFLUOROBUTAN	NOIC ACID	375-22-4	< 0.70	0.32	0.70	1.4	ug/kg	U	U	
PERFLUORODECAN	NE SULFONATE	335-77-3	6.7	0.55	1.1	1.4	ug/kg		J	17
PERFLUORODECAN	NOIC ACID	335-76-2	0.86	0.39	1.1	1.4	ug/kg	J	J	
PERFLUORODODEC	CANOIC ACID	307-55-1	1.3	0.39	1.1	1.4	ug/kg	J	J	
PERFLUOROHEPTA	NOIC ACID	375-85-9	0.57	0.27	0.70	1.4	ug/kg	J	J	
PERFLUOROHEXAN	NE SULFONATE	108427-53-8	1.7	0.34	0.70	1.4	ug/kg			
PERFLUOROHEXAN	NOIC ACID	307-24-4	1.7	0.20	0.70	1.4	ug/kg			
PERFLUORONONA	NOIC ACID	375-95-1	1.0	0.31	0.70	1.4	ug/kg	J	J	
PERFLUOROOCTAN	NE SULFONAMIDE	754-91-6	6.0	0.20	0.70	1.4	ug/kg		J	17
PERFLUOROOCTAN	NE SULFONATE	1763-23-1	67	3.6	11	14	ug/kg		J	17
PERFLUOROOCTAN	NOIC ACID	335-67-1	1.1	0.35	1.1	1.4	ug/kg	J	J	
PERFLUOROPENTA	NOIC ACID	2706-90-3	1.1	0.35	1.1	1.4	ug/kg	J	JB	06C
PERFLUOROTETRA	DECANOIC ACID	376-06-7	<1.1	0.43	1.1	1.4	ug/kg	U	U	
PERFLUOROTRIDE	CANOIC ACID	72629-94-8	0.66	0.46	1.1	1.4	ug/kg	J	J	
PERFLUOROUNDEO	CANOIC ACID	2058-94-8	1.0	0.48	1.1	1.4	ug/kg	J	J	

Analysis Method:	EPA 537 m								
Sample Name SHAW04-004-S	SW-001	Ν	Aatrix T	Type: W	R	esult Typ	e: TRG		
Lab Sample Name: FZY545	Sample	Date/Time:	2018-	01-27	12:04		Validatio	on Level: Sta	age 4
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	1.2	0.066	0.15	0.20	ug/L		J	08A;08B
8:2 FLUOROTELOMER SULFONATE	39108-34-4	0.29	0.0066	0.015	0.020	ug/L			
PERFLUOROBUTANE SULFONATE	29420-43-3	0.045	0.0054	0.015	0.020	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	0.23	0.0055	0.015	0.020	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	0.016	0.0061	0.015	0.020	ug/L	J	J	
PERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.19	0.0074	0.015	0.020	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	0.40	0.0056	0.015	0.020	ug/L			
PERFLUOROHEXANOIC ACID	307-24-4	0.73	0.0035	0.010	0.020	ug/L			
PERFLUORONONANOIC ACID	375-95-1	0.032	0.0087	0.018	0.020	ug/L			
PERFLUOROOCTANE SULFONAMIDE	754-91-6	0.011	0.0034	0.010	0.020	ug/L	J	J	
PERFLUOROOCTANE SULFONATE	1763-23-1	0.67	0.0060	0.015	0.020	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	0.18	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	0.84	0.0075	0.018	0.020	ug/L			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

M2032.0001

Tuesday, March 13, 2018

Sample Name SHAW04-004-S	SW-901	Ι	Matrix T	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY546	Sample	Date/Time:	2018-	01-27	12:04		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	1.3	0.066	0.15	0.20	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	0.29	0.0066	0.015	0.020	ug/L			
PERFLUOROBUTANE SULFONATE	29420-43-3	0.037	0.0054	0.015	0.020	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	0.25	0.0055	0.015	0.020	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	0.012	0.0061	0.015	0.020	ug/L	J	J	
PERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.19	0.0074	0.015	0.020	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	0.34	0.0056	0.015	0.020	ug/L			
PERFLUOROHEXANOIC ACID	307-24-4	0.72	0.0035	0.010	0.020	ug/L			
PERFLUORONONANOIC ACID	375-95-1	0.030	0.0087	0.018	0.020	ug/L			
PERFLUOROOCTANE SULFONAMIDE	754-91-6	0.0095	0.0034	0.010	0.020	ug/L	J	J	
PERFLUOROOCTANE SULFONATE	1763-23-1	0.63	0.0060	0.015	0.020	ug/L			
PERFLUOROOCTANOIC ACID	335-67-1	0.17	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	0.85	0.0075	0.018	0.020	ug/L			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name SHAW	05-001-SO-	024	I	Matrix T	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZ	Y540	Sample	Date/Time	: 2018-	-01-30	10:50		Validatio	on Level: Sta	age 2B
Analyte	C	AS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SULFO	ONATE 27	7619-97-2	3.5	0.22	0.68	0.85	ug/kg			
3:2 FLUOROTELOMER SULFO	ONATE 39	9108-34-4	6.9	0.28	0.68	0.85	ug/kg			
PERFLUOROBUTANE SULFO	NATE 29	9420-43-3	<0.43	0.14	0.43	0.85	ug/kg	U	U	
PERFLUOROBUTANOIC ACII	37	75-22-4	<0.43	0.20	0.43	0.85	ug/kg	U	U	
PERFLUORODECANE SULFO	NATE 33	35-77-3	<0.68	0.33	0.68	0.85	ug/kg	U	U	
PERFLUORODECANOIC ACII	33	35-76-2	<0.68	0.24	0.68	0.85	ug/kg	U	U	
PERFLUORODODECANOIC A	CID 30	07-55-1	<0.68	0.24	0.68	0.85	ug/kg	U	U	
PERFLUOROHEPTANOIC AC	ID 37	75-85-9	0.31	0.16	0.43	0.85	ug/kg	J	J	
PERFLUOROHEXANE SULFO	NATE 10	08427-53-8	< 0.43	0.20	0.43	0.85	ug/kg	U	U	
PERFLUOROHEXANOIC ACII	30	07-24-4	<0.43	0.12	0.43	0.85	ug/kg	U	U	
PERFLUORONONANOIC ACI	D 37	75-95-1	0.92	0.19	0.43	0.85	ug/kg			
PERFLUOROOCTANE SULFO	NAMIDE 75	54-91-6	<0.43	0.12	0.43	0.85	ug/kg	U	U	
PERFLUOROOCTANE SULFO	NATE 17	763-23-1	20	0.22	0.68	0.85	ug/kg			
PERFLUOROOCTANOIC ACII	) 33	35-67-1	0.76	0.21	0.68	0.85	ug/kg	J	J	
PERFLUOROPENTANOIC AC	ID 27	706-90-3	<0.68	0.21	0.68	0.85	ug/kg	U	U	
PERFLUOROTETRADECANO	IC ACID 37	76-06-7	<0.68	0.26	0.68	0.85	ug/kg	U	U	
PERFLUOROTRIDECANOIC A	ACID 72	2629-94-8	<0.68	0.28	0.68	0.85	ug/kg	U	U	
PERFLUOROUNDECANOIC A	CID 20	)58-94-8	<0.68	0.29	0.68	0.85	ug/kg	U	U	

Sample Name SHAW05-001-S	SS-001		Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY542	Sample	e Date/Time	e: 2018-	-01-27	13:47		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.70	0.23	0.70	0.88	ug/kg	U	U	
2 FLUOROTELOMER SULFONATE	39108-34-4	1.4	0.29	0.70	0.88	ug/kg			
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.44	0.15	0.44	0.88	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.44	0.20	0.44	0.88	ug/kg	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.70	0.34	0.70	0.88	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	2.3	0.25	0.70	0.88	ug/kg			
ERFLUORODODECANOIC ACID	307-55-1	1.2	0.25	0.70	0.88	ug/kg			
ERFLUOROHEPTANOIC ACID	375-85-9	0.76	0.17	0.44	0.88	ug/kg	J	J	
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.44	0.21	0.44	0.88	ug/kg	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	0.64	0.12	0.44	0.88	ug/kg	J	JB	06C
ERFLUORONONANOIC ACID	375-95-1	1.5	0.19	0.44	0.88	ug/kg			
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.44	0.12	0.44	0.88	ug/kg	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	1.7	0.23	0.70	0.88	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	1.0	0.22	0.70	0.88	ug/kg			
ERFLUOROPENTANOIC ACID	2706-90-3	1.2	0.22	0.70	0.88	ug/kg			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.69	0.27	0.69	0.86	ug/kg	U	UJ	10A
ERFLUOROTRIDECANOIC ACID	72629-94-8	0.54	0.28	0.69	0.86	ug/kg	J	J	10A
ERFLUOROUNDECANOIC ACID	2058-94-8	4.7	0.30	0.70	0.88	ug/kg			

Sample Name SHAV	W05-002-0	GW-033	I	Matrix T	ype: W	R	esult Typ	e: TRG		
Lab Sample Name:	FZY548	Sample	e Date/Time	2018-	01-27	15:50		Validati	on Level: Sta	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SUL	FONATE	27619-97-2	3.0	0.066	0.15	0.20	ug/L			
:2 FLUOROTELOMER SUL	FONATE	39108-34-4	0.012	0.0083	0.019	0.025	ug/L	J	J	
PERFLUOROBUTANE SULI	FONATE	29420-43-3	0.017	0.0068	0.019	0.025	ug/L	J	J	
PERFLUOROBUTANOIC AG	CID	375-22-4	0.22	0.0069	0.019	0.025	ug/L			
PERFLUORODECANE SUL	FONATE	335-77-3	< 0.019	0.0075	0.019	0.025	ug/L	U	U	
PERFLUORODECANOIC AG	CID	335-76-2	< 0.019	0.0076	0.019	0.025	ug/L	U	U	
PERFLUORODODECANOIC	C ACID	307-55-1	< 0.013	0.0063	0.013	0.025	ug/L	U	U	
PERFLUOROHEPTANOIC A	CID	375-85-9	0.21	0.0093	0.019	0.025	ug/L			
PERFLUOROHEXANE SUL	FONATE	108427-53-8	0.056	0.0070	0.019	0.025	ug/L			
PERFLUOROHEXANOIC AG	CID	307-24-4	0.44	0.0044	0.013	0.025	ug/L			
PERFLUORONONANOIC A	CID	375-95-1	0.027	0.011	0.023	0.025	ug/L			
PERFLUOROOCTANE SULI	FONAMIDE	754-91-6	< 0.013	0.0043	0.013	0.025	ug/L	U	U	
PERFLUOROOCTANE SULI	FONATE	1763-23-1	0.18	0.0075	0.019	0.025	ug/L			
PERFLUOROOCTANOIC AG	CID	335-67-1	0.12	0.0041	0.013	0.025	ug/L			
PERFLUOROPENTANOIC A	CID	2706-90-3	0.84	0.0094	0.023	0.025	ug/L			
PERFLUOROTETRADECAN	NOIC ACID	376-06-7	< 0.013	0.0034	0.013	0.025	ug/L	U	U	
PERFLUOROTRIDECANOIO	C ACID	72629-94-8	< 0.013	0.0048	0.013	0.025	ug/L	U	U	
PERFLUOROUNDECANOIC	C ACID	2058-94-8	< 0.013	0.0031	0.013	0.025	ug/L	U	U	

Sample Name	SHAW05-002-	-SO-034		Matrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name	e: FZY539	Sampl	e Date/Time	2018	-01-27	13:05		Validatio	on Level: Sta	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOM	IER SULFONATE	27619-97-2	0.63	0.23	0.70	0.88	ug/kg	J	JB	06C
3:2 FLUOROTELOM	ER SULFONATE	39108-34-4	< 0.70	0.29	0.70	0.88	ug/kg	U	U	
PERFLUOROBUTAN	NE SULFONATE	29420-43-3	<0.44	0.15	0.44	0.88	ug/kg	U	U	
PERFLUOROBUTAN	NOIC ACID	375-22-4	<0.44	0.20	0.44	0.88	ug/kg	U	U	
PERFLUORODECAN	NE SULFONATE	335-77-3	< 0.70	0.34	0.70	0.88	ug/kg	U	U	
PERFLUORODECAN	NOIC ACID	335-76-2	< 0.70	0.25	0.70	0.88	ug/kg	U	U	
PERFLUORODODE	CANOIC ACID	307-55-1	< 0.70	0.25	0.70	0.88	ug/kg	U	U	
PERFLUOROHEPTA	NOIC ACID	375-85-9	< 0.44	0.17	0.44	0.88	ug/kg	U	U	
PERFLUOROHEXA	NE SULFONATE	108427-53-8	< 0.44	0.21	0.44	0.88	ug/kg	U	U	
PERFLUOROHEXAN	NOIC ACID	307-24-4	< 0.44	0.12	0.44	0.88	ug/kg	U	U	
PERFLUORONONA	NOIC ACID	375-95-1	< 0.44	0.19	0.44	0.88	ug/kg	U	U	
PERFLUOROOCTAN	NE SULFONAMIDE	E 754-91-6	< 0.44	0.12	0.44	0.88	ug/kg	U	U	
PERFLUOROOCTAN	NE SULFONATE	1763-23-1	< 0.70	0.23	0.70	0.88	ug/kg	U	U	
PERFLUOROOCTAN	NOIC ACID	335-67-1	< 0.70	0.22	0.70	0.88	ug/kg	U	U	
PERFLUOROPENTA	NOIC ACID	2706-90-3	< 0.70	0.22	0.70	0.88	ug/kg	U	U	
PERFLUOROTETRA	DECANOIC ACID	376-06-7	< 0.70	0.27	0.70	0.88	ug/kg	U	U	
PERFLUOROTRIDE	CANOIC ACID	72629-94-8	< 0.70	0.29	0.70	0.88	ug/kg	U	U	
PERFLUOROUNDE	CANOIC ACID	2058-94-8	< 0.70	0.30	0.70	0.88	ug/kg	U	U	

Sample Name SHAW05-002-	-SS-001		Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY531	Sample	e Date/Time	e: 2018-	-01-27	12:03		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
5:2 FLUOROTELOMER SULFONATE	27619-97-2	<0.79	0.26	0.79	0.99	ug/kg	U	U	
3:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.79	0.33	0.79	0.99	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.50	0.17	0.50	0.99	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.50	0.23	0.50	0.99	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.79	0.39	0.79	0.99	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.79	0.28	0.79	0.99	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.79	0.28	0.79	0.99	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.50	0.19	0.50	0.99	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	< 0.50	0.24	0.50	0.99	ug/kg	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.50	0.14	0.50	0.99	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	< 0.50	0.22	0.50	0.99	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDI	E 754-91-6	< 0.50	0.14	0.50	0.99	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	1.6	0.26	0.79	0.99	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	0.76	0.25	0.79	0.99	ug/kg	J	J	
PERFLUOROPENTANOIC ACID	2706-90-3	0.36	0.25	0.79	0.99	ug/kg	J	JB	06C
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.79	0.31	0.79	0.99	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.79	0.33	0.79	0.99	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	0.58	0.34	0.79	0.99	ug/kg	J	J	

Sample Name SHAW05-002-	SS-901		Matrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZY532	Sample	e Date/Time	e: 2018-	-01-27	12:03		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.76	0.25	0.76	0.95	ug/kg	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.76	0.31	0.76	0.95	ug/kg	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.48	0.16	0.48	0.95	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	<0.48	0.22	0.48	0.95	ug/kg	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.76	0.37	0.76	0.95	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	0.48	0.27	0.76	0.95	ug/kg	J	J	
ERFLUORODODECANOIC ACID	307-55-1	< 0.76	0.27	0.76	0.95	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	0.50	0.18	0.48	0.95	ug/kg	J	J	
ERFLUOROHEXANE SULFONATE	108427-53-8	<0.48	0.23	0.48	0.95	ug/kg	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	0.43	0.13	0.48	0.95	ug/kg	J	JB	06C
ERFLUORONONANOIC ACID	375-95-1	0.68	0.21	0.48	0.95	ug/kg	J	J	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	0.68	0.13	0.48	0.95	ug/kg	J	J	
ERFLUOROOCTANE SULFONATE	1763-23-1	1.6	0.25	0.76	0.95	ug/kg			
ERFLUOROOCTANOIC ACID	335-67-1	0.60	0.24	0.76	0.95	ug/kg	J	J	
ERFLUOROPENTANOIC ACID	2706-90-3	0.77	0.24	0.76	0.95	ug/kg	J	JB	06C
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.76	0.29	0.76	0.95	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.76	0.31	0.76	0.95	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	0.59	0.32	0.76	0.95	ug/kg	J	J	

Sample Name SHAW05-003-0	GW-032	]	Matrix 7	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY537	Sample	e Date/Time	: 2018-	01-28	13:54		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier		Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	0.78	0.0066	0.015	0.020	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	0.058	0.0054	0.015	0.020	ug/L			
ERFLUOROBUTANOIC ACID	375-22-4	0.13	0.0055	0.015	0.020	ug/L			
ERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	0.099	0.0074	0.015	0.020	ug/L			
ERFLUOROHEXANE SULFONATE	108427-53-8	0.29	0.0056	0.015	0.020	ug/L			
ERFLUOROHEXANOIC ACID	307-24-4	0.34	0.0035	0.010	0.020	ug/L			
ERFLUORONONANOIC ACID	375-95-1	0.020	0.0087	0.018	0.020	ug/L			
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	0.51	0.0060	0.015	0.020	ug/L			
ERFLUOROOCTANOIC ACID	335-67-1	0.076	0.0033	0.010	0.020	ug/L			
ERFLUOROPENTANOIC ACID	2706-90-3	0.44	0.0075	0.018	0.020	ug/L			
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Sample Name SHAW05-003-S	SO-027		Matrix T	ype: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY530	Sampl	e Date/Time	2018-	01-27	11:17		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	<0.68	0.22	0.68	0.85	ug/kg	U	U	
2 FLUOROTELOMER SULFONATE	39108-34-4	<0.68	0.28	0.68	0.85	ug/kg	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.43	0.14	0.43	0.85	ug/kg	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.43	0.20	0.43	0.85	ug/kg	U	U	
ERFLUORODECANE SULFONATE	335-77-3	<0.68	0.33	0.68	0.85	ug/kg	U	U	
ERFLUORODECANOIC ACID	335-76-2	<0.68	0.24	0.68	0.85	ug/kg	U	U	
ERFLUORODODECANOIC ACID	307-55-1	<0.68	0.24	0.68	0.85	ug/kg	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.43	0.16	0.43	0.85	ug/kg	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.43	0.20	0.43	0.85	ug/kg	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	< 0.43	0.12	0.43	0.85	ug/kg	U	U	
ERFLUORONONANOIC ACID	375-95-1	< 0.43	0.19	0.43	0.85	ug/kg	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.43	0.12	0.43	0.85	ug/kg	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	0.26	0.22	0.68	0.85	ug/kg	J	J	
ERFLUOROOCTANOIC ACID	335-67-1	<0.68	0.21	0.68	0.85	ug/kg	U	U	
ERFLUOROPENTANOIC ACID	2706-90-3	<0.68	0.21	0.68	0.85	ug/kg	U	U	
ERFLUOROTETRADECANOIC ACID	376-06-7	<0.68	0.26	0.68	0.85	ug/kg	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	<0.68	0.28	0.68	0.85	ug/kg	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	<0.68	0.29	0.68	0.85	ug/kg	U	U	

Sample Name SHAW05-003-	SS-001		Matrix 7	Гуре: S	R	esult Typ	e: TRG		
Lab Sample Name: FZY529	Sampl	e Date/Time	e: 2018	-01-27	10:42		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
2:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.80	0.26	0.80	1.0	ug/kg	U	U	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.50	0.17	0.50	1.0	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.50	0.23	0.50	1.0	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.80	0.39	0.80	1.0	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.50	0.19	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	< 0.50	0.24	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.50	0.14	0.50	1.0	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	0.41	0.22	0.50	1.0	ug/kg	J	J	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.50	0.14	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	6.2	0.26	0.80	1.0	ug/kg			
PERFLUOROOCTANOIC ACID	335-67-1	< 0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	0.30	0.25	0.80	1.0	ug/kg	J	JB	06C
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.80	0.31	0.80	1.0	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.80	0.34	0.80	1.0	ug/kg	U	U	

Sample Name SHAW05-004-0	GW-031	I	Matrix 7	<b>ype:</b> W	R	lesult Typ	e: TRG		
Lab Sample Name: FZY538	Sample	e Date/Time	2018-	01-28	14:42		Validati	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	0.036	0.0066	0.015	0.020	ug/L			
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	0.021	0.0054	0.015	0.020	ug/L			
PERFLUOROBUTANOIC ACID	375-22-4	0.049	0.0055	0.015	0.020	ug/L			
PERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	0.083	0.0074	0.015	0.020	ug/L			
PERFLUOROHEXANE SULFONATE	108427-53-8	0.23	0.0056	0.015	0.020	ug/L			
PERFLUOROHEXANOIC ACID	307-24-4	0.12	0.0035	0.010	0.020	ug/L			
ERFLUORONONANOIC ACID	375-95-1	0.014	0.0087	0.018	0.020	ug/L	J	J	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	0.080	0.0060	0.015	0.020	ug/L			
ERFLUOROOCTANOIC ACID	335-67-1	0.082	0.0033	0.010	0.020	ug/L			
PERFLUOROPENTANOIC ACID	2706-90-3	0.13	0.0075	0.018	0.020	ug/L			
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.009	0.0024	0.009	0.018	ug/L	U	UJ	10A
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.009	0.0034	0.009	0.018	ug/L	U	UJ	10A
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Analysis Method:	EPA 537 m	l							
Sample Name SHAW05-004-	SO-028	Ν	latrix 7	Г <b>уре:</b> S	R	esult Typ	e: TRG		
Lab Sample Name: FZY528	Sample	Date/Time:	2018-	-01-27	10:08		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.80	0.26	0.80	1.0	ug/kg	U	U	
8:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.50	0.17	0.50	1.0	ug/kg	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.50	0.23	0.50	1.0	ug/kg	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.80	0.39	0.80	1.0	ug/kg	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.80	0.28	0.80	1.0	ug/kg	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	<0.50	0.19	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	<0.50	0.24	0.50	1.0	ug/kg	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	<0.50	0.14	0.50	1.0	ug/kg	U	U	
PERFLUORONONANOIC ACID	375-95-1	<0.50	0.22	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONAMIDE	E 754-91-6	<0.50	0.14	0.50	1.0	ug/kg	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	0.78	0.26	0.80	1.0	ug/kg	J	J	
PERFLUOROOCTANOIC ACID	335-67-1	< 0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.80	0.25	0.80	1.0	ug/kg	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.80	0.31	0.80	1.0	ug/kg	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	<0.80	0.33	0.80	1.0	ug/kg	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.80	0.34	0.80	1.0	ug/kg	U	U	

## Tuesday, March 13, 2018

Sample Name SHAV	W05-004-SS	5-001	]	Matrix 7	<b>Sype:</b> S	R	esult Typ	e: TRG		
Lab Sample Name:	FZY527	Sample	e Date/Time	: 2018-	01-27	09:28		Validatio	on Level: Sta	age 2B
Analyte		CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SUL	FONATE	27619-97-2	< 0.88	0.29	0.88	1.1	ug/kg	U	U	
:2 FLUOROTELOMER SUL	FONATE	39108-34-4	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROBUTANE SULF	FONATE	29420-43-3	< 0.55	0.19	0.55	1.1	ug/kg	U	U	
PERFLUOROBUTANOIC AC	CID	375-22-4	< 0.55	0.25	0.55	1.1	ug/kg	U	U	
PERFLUORODECANE SULF	FONATE	335-77-3	< 0.88	0.43	0.88	1.1	ug/kg	U	U	
PERFLUORODECANOIC AC	CID	335-76-2	< 0.88	0.31	0.88	1.1	ug/kg	U	U	
PERFLUORODODECANOIC	ACID	307-55-1	< 0.88	0.31	0.88	1.1	ug/kg	U	U	
PERFLUOROHEPTANOIC A	.CID	375-85-9	< 0.55	0.21	0.55	1.1	ug/kg	U	U	
PERFLUOROHEXANE SULF	FONATE	108427-53-8	< 0.55	0.26	0.55	1.1	ug/kg	U	U	
PERFLUOROHEXANOIC AC	CID	307-24-4	< 0.55	0.15	0.55	1.1	ug/kg	U	U	
ERFLUORONONANOIC AG	CID	375-95-1	< 0.55	0.24	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTANE SULF	FONAMIDE	754-91-6	< 0.55	0.15	0.55	1.1	ug/kg	U	U	
PERFLUOROOCTANE SULF	FONATE	1763-23-1	5.1	0.29	0.88	1.1	ug/kg			
PERFLUOROOCTANOIC AC	CID	335-67-1	< 0.88	0.28	0.88	1.1	ug/kg	U	U	
PERFLUOROPENTANOIC A	CID	2706-90-3	< 0.88	0.28	0.88	1.1	ug/kg	U	U	
PERFLUOROTETRADECAN	OIC ACID	376-06-7	< 0.88	0.34	0.88	1.1	ug/kg	U	U	
PERFLUOROTRIDECANOIC	CACID	72629-94-8	< 0.88	0.36	0.88	1.1	ug/kg	U	U	
PERFLUOROUNDECANOIC	ACID	2058-94-8	< 0.88	0.37	0.88	1.1	ug/kg	U	U	

# *Analysis Method:* EPA 537 m

Sample Name SHAW-RS-005		I	Matrix 7	ype: W	R	esult Typ	e: TRG		
Lab Sample Name: FZY547	Sample	e Date/Time	: 2018-	01-27	15:40		Validati	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.015	0.0055	0.015	0.020	ug/L	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.015	0.0074	0.015	0.020	ug/L	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.015	0.0056	0.015	0.020	ug/L	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	< 0.010	0.0035	0.010	0.020	ug/L	U	U	
ERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUOROOCTANOIC ACID	335-67-1	< 0.010	0.0033	0.010	0.020	ug/L	U	U	
ERFLUOROPENTANOIC ACID	2706-90-3	< 0.018	0.0075	0.018	0.020	ug/L	U	U	
ERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

# *Analysis Method:* EPA 537 m

Analysis Method:	EPA 537 m								
Sample Name SHAW-RS-006	ĵ	Ν	Aatrix T	<b>ype:</b> W	R	esult Typ	e: TRG		
Lab Sample Name: FZY533	Sample	Date/Time:	2018-	01-28	08:45		Validatio	on Level: Sta	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
6:2 FLUOROTELOMER SULFONATE	27619-97-2	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
8:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANE SULFONATE	29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U	
PERFLUOROBUTANOIC ACID	375-22-4	< 0.015	0.0055	0.015	0.020	ug/L	U	U	
PERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
PERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
PERFLUOROHEPTANOIC ACID	375-85-9	< 0.015	0.0074	0.015	0.020	ug/L	U	U	
PERFLUOROHEXANE SULFONATE	108427-53-8	< 0.015	0.0056	0.015	0.020	ug/L	U	U	
PERFLUOROHEXANOIC ACID	307-24-4	< 0.010	0.0035	0.010	0.020	ug/L	U	U	
PERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
PERFLUOROOCTANE SULFONAMIDE	754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
PERFLUOROOCTANE SULFONATE	1763-23-1	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
PERFLUOROOCTANOIC ACID	335-67-1	< 0.010	0.0033	0.010	0.020	ug/L	U	U	
PERFLUOROPENTANOIC ACID	2706-90-3	< 0.018	0.0075	0.018	0.020	ug/L	U	U	
PERFLUOROTETRADECANOIC ACID	376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
PERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
PERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

Tuesday, March 13, 2018

Sample Name SHAW-RS-00	07	]	Matrix T	<b>ype:</b> W	R	lesult Typ	e: TRG		
Lab Sample Name: FZY541	Sample	e Date/Time	: 2018-	01-30	10:00		Validatio	on Level: St	age 2B
Analyte	CAS No	Result Value	DL	LOD	LOQ	Result Units	Lab Qualifier	Validation Qualifier	Validation Reason Code
:2 FLUOROTELOMER SULFONATE	27619-97-2	0.016	0.0066	0.015	0.020	ug/L	J	J	
:2 FLUOROTELOMER SULFONATE	39108-34-4	< 0.015	0.0066	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANE SULFONATE	29420-43-3	< 0.015	0.0054	0.015	0.020	ug/L	U	U	
ERFLUOROBUTANOIC ACID	375-22-4	< 0.015	0.0055	0.015	0.020	ug/L	U	U	
ERFLUORODECANE SULFONATE	335-77-3	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUORODECANOIC ACID	335-76-2	< 0.015	0.0061	0.015	0.020	ug/L	U	U	
ERFLUORODODECANOIC ACID	307-55-1	< 0.010	0.0050	0.010	0.020	ug/L	U	U	
ERFLUOROHEPTANOIC ACID	375-85-9	< 0.015	0.0074	0.015	0.020	ug/L	U	U	
ERFLUOROHEXANE SULFONATE	108427-53-8	< 0.015	0.0056	0.015	0.020	ug/L	U	U	
ERFLUOROHEXANOIC ACID	307-24-4	0.0091	0.0035	0.010	0.020	ug/L	J	J	
ERFLUORONONANOIC ACID	375-95-1	< 0.018	0.0087	0.018	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONAMIE	DE 754-91-6	< 0.010	0.0034	0.010	0.020	ug/L	U	U	
ERFLUOROOCTANE SULFONATE	1763-23-1	< 0.015	0.0060	0.015	0.020	ug/L	U	U	
ERFLUOROOCTANOIC ACID	335-67-1	< 0.010	0.0033	0.010	0.020	ug/L	U	U	
ERFLUOROPENTANOIC ACID	2706-90-3	0.013	0.0075	0.018	0.020	ug/L	J	J	
ERFLUOROTETRADECANOIC ACI	D 376-06-7	< 0.010	0.0027	0.010	0.020	ug/L	U	U	
ERFLUOROTRIDECANOIC ACID	72629-94-8	< 0.010	0.0038	0.010	0.020	ug/L	U	U	
ERFLUOROUNDECANOIC ACID	2058-94-8	< 0.010	0.0025	0.010	0.020	ug/L	U	U	

# *Analysis Method:* EPA 537 m

Frequent Names Dies Britan	er er er en staat de staat de sere er verstaa Ar-		and the second se	HAU AF				AAL VIERS		rage 1 48 or 4	18
Renostar Proposi Managor Band Data te: Renoptie(b)		470) 207-4804 866) 403-7954			-		-		X	Manyle Typec M = Assert FD = Field Duplicate AB = Astern Black of Field Respirit Nam (B) = Foughter Black	
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eruslar Prigett Metaget: eed Bata to:		78) 287-4896 68) 463-7884								1	1	Sangéo Types: N - Norna FD - Field Dualizatio				
10 g for (1)	J. Klein					1				1	1	AB + Arthurt Durt or Paul Respect Dark SB + Exspected Result	1	8	*	
donatory Nanot-Address Longer Analytics, Inc Mit Campolenille Hut Unidearuga, Unitario Hitlus Hitlus	Laboratory Strapping Addito Manaem Analytics Unit Feith Depent 200 Explore Rd Cheskinsega, NY 14235 Please indicate "HOLD FOR PE		Phone (10) multi Ma	0 817-8706	ext. 6794	and the second value of			Ø		-	Matrix WG = Securitudian 90 - Sec WP = Polates Water SE = Bedmart WS = Surface Water WS = Surface Water WG = Pietr GC (A), ED)				1
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erostar Project Manager: and Oata Inc.	Bitan Delen, Bölden@apropress.com i Jacob Varies, presse@aecator.pet	478) 287-4088 (885) 483-7304								1-1			etal di Dupicata								
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nd Data ta	Brian Deters, BDdoerdjinawepmenacers a Jamey Vance, Internet Bear Oathan and I	(16) (MT 4808) (83) 483 7994					1			Sample Types N = Normal FD = Part Overware	
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		1.10	La cu		1.0	1			-	HOTES	
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Required speed	SHAW06-101-55-001	1.1.1.1	0825	N	50	17		명물람		w/ F#Aws - +++ - ++ - +++	
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	SHAND	1125/18	1545	N	50	17	- 06	=	13.00	alle alles by mer marine un	
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upod Narra: Silo Inspectio erro Basen in the Eastern I	en of free Fighting Fours Usage of Vertoon Air Joined Bates	Sec.	Job Ho ; M											2		10
Postar Project Menegar nd Data to:	Briss Odan, BOdan@springrowsy.com Jerring Varice, jource@percistar.out	(478) 287-4988 (985) 423-7964		- Thinkson and		T	T	T	ARALTS	-	1	Surgets Types				
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Ŧ	JUANOI - MUNIZIA- 640-022	41/241 2317	1710	N	WE	2		-		+	-	HOTES				
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	1/26/18 1500	Fulars		Wel :	7 /3	20	Analytic Lines	-			Prove	PROPERTY AND ADDRESS OF THE DOCTOR			60	
*	100*+4	SEARATION	3	5/4-1	12.8	-		-			197418. 197718.	Alternative data				
tes .	her;	The last	-	84		-				e., .	PERSONAL PERSONNAL PERSONN	The second secon	1			

# Appendix E Physiochemical Sample Results

		Percent Passing	Percent Passing				
		No. 4	No. 200	USCS	TOC	pН	Percent
AFFF Area	Sample No.	Screen	Screen	Class	(mg/kg)	(units)	Solid
AFFF Area 1 Former FTA 1	SHAW01-004-SS-001	100	8.7	SP-SM	2,800	5.11	96.7
AFFF Area I Former FTA I	SHAW01-004-SO-004	100	19.4	SM	1,230	5.53	89.4
AFFF Area 2 Former FTA 2	SHAW02-004-SO-018	99.5	2.8	SW	156 J	5.21	95.9
AFFF Area 3 Former FTA 3 /	SHAW03-004-SS-001	90.4	18.7	SM	7,390	6.21	91.6
EOD Area	SHAW03-004-SO-016	99.3	12.7	SM	361	5.69	88.5
AFFF Area 4 Current FTA	SHAW04-005-SS-001	100	18.9	SM	2,000	5.28	93.7
AFFF Alea 4 Cullent FTA	SHAW04-005-SO-013	100	4.1	SW	267	5.56	95.4
AFEE Area 5 Duilding 1511	SHAW05-005-SS-001	98.6	26.8	SM	5,590	6.06	90.5
AFFF Area 5 Building 1511	SHAW05-005-SO-031	100	10.4	SP-SM	128 J	5.99	94.8
AFFF Area 6 Wastewater	SHAW06-004-SS-001	98.3	21.3	SM	3,580	5.40	84.5
Treatment Plant	SHAW06-004-SO-027	99.3	46.0	SM	112 J	4.67	80.9

## **Table E-1 Physiochemical Sample Results**

AFFF = aqueous film forming foam

mg/kg = milligrams per kilogram pH = potential of hydrogen

SM = silty sand

SP = poorly graded or gravelly sands SW = well-graded sands

USCS = Unified Soil Classification System

J = estimated value

No. = number

SHAW = Shaw Air Force Base SO = subsurface soil SS = surface soil

TOC = total organic carbon



delivering more than data from your environmental analyses

## Case Narrative

Client: MAXXAM/Aerostar SES LLC Project: Shaw AFB, SC Sample Receipt Date(s): 01-31-2018 SDG #: 133832

Eleven samples were analyzed for (GSA)/hydrometer, pH, and TOC. GSA/hydrometer analyses were sub-contracted to Mi-Tech, Weston, WI. The assigned sample ID numbers, date sampled, and date received are indicated in the attached Project Summary. The samples were received intact and at a temperature within method specified acceptance limits. Any exceptions are noted below. The analyses were performed, where applicable, following QSM 5.0 requirements.

## **Sample Analysis and Quality Control**

## Inorganics:

The samples were analyzed using US EPA Method 9045D (pH) and the Llyod-Kahn method (total organic carbon, TOC). All samples were analyzed within the holding time. The following summaries of quality control procedures are included:

Initial and Continuing Calibration Verification Blanks Summary ICP Interference Check Data Spike Sample Recovery Duplicates Data Laboratory Control Sample Data Analysis Run Log

All analysis results met the method specified quality control criteria with the following exceptions:

## pH (9045D) Solid Analyses

#### Analytical Run # 146373

All analysis results for this analytical run met the method/project specified quality control criteria.

## TOC (Lloyd-Kahn) Solid Analyses

#### Analytical Run # 146428

All analysis results for this analytical run met the method/project specified quality control criteria.



## **Data Qualifiers**

#### Code Description

- A Analyte averaged calibration criteria within acceptable limits.
- B Analyte detected in associated Method Blank.
- C Toxicity present in BOD sample.
- D Diluted Out.
- E Safe, No Total Coliform detected.
- F Unsafe, Total Coliform detected, no E. Coli detected.
- G Unsafe, Total Coliform detected and E. Coli detected.
- H Holding time exceeded.
- J Estimated value.
- L Significant peaks were detected outside the chromatographic window.
- M Matrix spike and/or Matrix Spike Duplicate recovery outside acceptance limits.
- N Insufficient BOD oxygen depletion.
- O Complete BOD oxygen depletion.
- P Concentration of analyte differs more than 40% between primary and confirmation analysis.
- Q Laboratory Control Sample outside acceptance limits.
- R See Narrative at end of report.
- S Surrogate standard recovery outside acceptance limits due to apparent matrix effects.
- T Sample received with improper preservation or temperature.
- U Analyte concentration was not above the detection level.
- V Raised Quantitation or Reporting Limit due to limited sample amount or dilution for matrix background interference.
- W Sample amount received was below program minimum.
- X Analyte exceeded calibration range.
- Y Replicate/Duplicate precision outside acceptance limits.
- Z Calibration criteria exceeded.



## MANUAL INTEGRATION REASON CODES

CTLaboratories has identified four general cases with valid reasons supporting the use of manual integration techniques. These codes are used on chromatograms in this data package to document the reasons for manual integrations per CTLaboratories' SOP SS-10 current revision.

#### #1: Data system failed to select the correct peak or missed the peak entirely.

In some cases the chromatography system selects and integrates the "wrong peak". In this case the analyst must correct the selection and force the system to integrate the proper peak. In other instances the system may miss the peak completely. In this case the analyst manually integrated the peak

## #2: Data System Splits the Peak Incorrectly or Integrates a False Peak as a Rider Peak.

This phenomenon is common at low concentrations where the signal to noise ratio is low. A single compound (peak) is incorrectly split into multiple peaks or integrated as a main peak with one or more rider peaks resulting in low or high area counts for the target compound.

## #3: Improperly Integrated Isomers and/or coeluting compounds.

For when the system fails to distinguish coeluting compounds and or isomers. The integration areas and concentrations may be inaccurate, and they must be corrected by manual integration. Prime examples are compounds that are unresolved and integrated improperly when present at low concentrations in standards or samples.

## #4: System Established Incorrect Baseline.

There are numerous situations in chromatography where the system establishes the baseline incorrectly. Some baseline errors will be obvious to the analyst and may be corrected via manual procedures.

#### #5: Miscellaneous.

Some situations involving integration errors may require in-depth review and technical judgment. These cases should be brought to the attention of the group supervisor. If the form of manual integration is not clearly covered by these four cases, then review and approval by the group supervisor or the *QA/QC* Supervisor will be required.

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leitvering more than data from	n your environmental anal	4000			Sar	mple Descrip	tion
		1 INORGANIC ANALYSIS L	ATA SHEET		SHAW0	1-004-SO-00	4
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	S
Matrix (soil/water):	SOIL	:	SDG No.:	133832	2		
% Solids:	89.4		_ab Sample ID:	<u>979019</u>	9		
Analytical Method:	EPA 8000C		Date Received:	01/31/2018			
Dilution Factor:	1.00		CLP/SPLP Extraction	n Date/ti	me:		
Analytical Run #:	146330		Analysis Date/Time	02/	01/2018	12:00	
Analytical Prep Batch #:			Prep. Date/Time:				
ICAL Calibration #:			Concentration Units:	%			
CAS #	Analyte	Concentratio	n Qualifiers	DL	LOD	LOQ	RL
SOLID Solid	ls, Percent	89.4		0.1	0.1	0.1	0.1

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	IN	1 ORGANIC ANALYSIS DA	ATA SHEET		SHAWO	1-004-SO-00	4
Lab Name:	CT Laboratories	C	ontract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	S
Matrix (soil/water):	SOIL	S	DG No.:	133832	2		
% Solids:	89.4	Li	ab Sample ID:	<u>979019</u>			
Analytical Method:	EPA 9045D	D	ate Received:	01/31/2018			
Dilution Factor:	1	т	CLP/SPLP Extraction				
Analytical Run #:	146373	A	nalysis Date/Time	02/0	02/2018	12:27	
Analytical Prep Batch #:		P	rep. Date/Time:				
ICAL Calibration #:		c	oncentration Units:	S.U	I.		
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL
PH pH		5.53		0.1	0.1	0.1	0.1

					Sa	mple Descrip	tion	
	IN	1 ORGANIC ANALYSIS L	DATA SHEET		SHAWO	)1-004-SO-00	4	
Lab Name:	CT Laboratories		Contract: MAXX	AM ANALYTI	CS-SI MULTI	PLE AFFF SITE	ES	
Matrix (soil/water):	SOIL		SDG No.:	13383	2			
% Solids:	89.4		Lab Sample ID:	97901	979019			
Analytical Method:	L-Kahn/9060A		Date Received:	01/31/	01/31/2018			
Dilution Factor:	1.00		TCLP/SPLP Extra	action Date/t	ime:			
Analytical Run #:	146428		Analysis Date/Tir	ne 02/	/07/2018	13:53		
Analytical Prep Batch #:			Prep. Date/Time:					
ICAL Calibration #:	TOCS ICA		Concentration Ur	nits: mg	ı/kg			
CAS #	Analyte	Concentratio	n Qualifiers	DL	LOD	LOQ	RL	
TOC Tot	al Organic Carbon	1230		40	84	170	170	

elivering more than data fro	m your environmental analyse	00			Sa	mple Descrip	tion	
	IN	1 IORGANIC ANALYSIS I	DATA SHEET	SHAW01-004-SS-001				
Lab Name:	CT Laboratories		Contract: MAXXAM	ANALYTIC	S-SI MULTI	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL		SDG No.:	133832	2			
% Solids:	96.7		Lab Sample ID:	<u>979017</u>	979017			
Analytical Method:	EPA 8000C		Date Received:	01/31/2018				
Dilution Factor:	_1.00		TCLP/SPLP Extraction	on Date/ti	me:			
Analytical Run #:	146330		Analysis Date/Time	02/0	01/2018	12:00		
Analytical Prep Batch #:			Prep. Date/Time:					
ICAL Calibration #:			Concentration Units:	%				
CAS #	Analyte	Concentratio	n Qualifiers	DL	LOD	LOQ	RL	
SOLID Solid	ls, Percent	96.7		0.1	0.1	0.1	0.1	

eliverin <u>a</u> more than data from	your environmental analyses	1		Sample Description SHAW01-004-SS-001				
	INORGAN	NIC ANALYSIS D	ATA SHEET		onan	/1-004-00-00	•	
Lab Name:	CT Laboratories	(	Contract: MAXXAM	ANALYTIC	S-SI MULTIF	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL		DG No.:	133832	2			
% Solids:	96.7	L	ab Sample ID:	<u>979017</u>	7			
Analytical Method:	EPA 9045D		Date Received:	01/31/2018				
Dilution Factor:	1	ו	CLP/SPLP Extraction	on Date/tir				
Analytical Run #:	146373	A	nalysis Date/Time	02/0	02/2018	12:27		
Analytical Prep Batch #:		F	Prep. Date/Time:					
ICAL Calibration #:		(	Concentration Units:	S.U				
CAS #	Analyte	Concentratior	Qualifiers	DL	LOD	LOQ	RL	
PH pH		5.11		0.1	0.1	0.1	0.1	

elivering more than data fr	om your environmental analyse	26				Sa	mple Descrip	tion
	IN	1 IORGANIC ANALYSIS E	DATA SHEE	T		SHAW	01-004-SS-00	1
Lab Name:	CT Laboratories	(	Contract:	MAXXAM AI	NALYTIC	S-SI MULTI	PLE AFFF SITE	ES
Matrix (soil/water):	SOIL		SDG No.:		133832	2		
% Solids:	96.7	I	Lab Sample	e ID:	979017			
Analytical Method:	L-Kahn/9060A		Date Recei <sup>,</sup>	ved:	01/31/2018			
Dilution Factor:	1.00		TCLP/SPLF	P Extraction	Date/tir	me: _		
Analytical Run #:	146428		Analysis Da	ate/Time	02/0	07/2018	13:48	
Analytical Prep Batch #:			Prep. Date/	Time:				
ICAL Calibration #:	TOCS ICA		Concentrati	on Units:	mg/	′kg		
CAS #	Analyte	Concentratio	n Qual	ifiers	DL	LOD	LOQ	RL
TOC Tot	tal Organic Carbon	2800			37	78	160	160

CTLABO	RATORI	alysos			Sa	mple Descrip	tion		
		1 INORGANIC ANALYSIS I	DATA SHEET		SHAWO	2-004-SO-01	8		
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	S		
Matrix (soil/water):	SOIL		SDG No.:	133832	2				
% Solids:	95.9		Lab Sample ID:	979020	979020 01/31/2018				
Analytical Method:	EPA 8000C		Date Received:	01/31/2018					
Dilution Factor:	1.00		TCLP/SPLP Extraction	n Date/ti	me:				
Analytical Run #:	146330		Analysis Date/Time	02/0	01/2018	12:00			
Analytical Prep Batch #:			Prep. Date/Time:						
ICAL Calibration #:			Concentration Units:	%	%				
CAS #	Analyte	Concentratio	n Qualifiers	DL	LOD	LOQ	RL		
SOLID So	lids, Percent	95.9		0.1	0.1	0.1	0.1		

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	INO	1 RGANIC ANALYSIS DA	TA SHEET		SHAWO	2-004-SO-01	8
Lab Name:	CT Laboratories	Co	ntract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	S
Matrix (soil/water):	SOIL	SD	G No.:	133832	2		
% Solids:	95.9	Lal	o Sample ID:	<u>979020</u>	)		
Analytical Method:	EPA 9045D	Da	te Received:	01/31/2018			
Dilution Factor:	_1	тс	LP/SPLP Extraction				
Analytical Run #:	146373	An	alysis Date/Time	02/0	02/2018	12:27	
Analytical Prep Batch #:		Pre	ep. Date/Time:				
ICAL Calibration #:		Co	ncentration Units:	S.U	l.		
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL
РН рН		5.21		0.1	0.1	0.1	0.1

<b>CILHDU</b> delivering more than data fr	K H I U K I E	1/1000			Sa	mple Descrip	tion	
		1 INORGANIC ANALYSIS	DATA SHEET		SHAWO	02-004-SO-01	8	
Lab Name:	CT Laboratories		Contract: MAXXAM	ANALYTIC	S-SI MULTIF	PLE AFFF SITE	ES	
Matrix (soil/water):	SOIL		SDG No.:	133832	2			
% Solids:	95.9		Lab Sample ID:	<u>97902</u>	)			
Analytical Method:	L-Kahn/9060A		Date Received:	01/31/2018				
Dilution Factor:	1.00		TCLP/SPLP Extraction	on Date/ti				
Analytical Run #:	146428		Analysis Date/Time	02/	07/2018	14:04		
Analytical Prep Batch #:			Prep. Date/Time:					
ICAL Calibration #:	TOCS ICA		Concentration Units:	mg	/kg			
CAS #	Analyte	Concentratio	on Qualifiers	DL	LOD	LOQ	RL	
TOC Tot	al Organic Carbon	156	J	38	78	160	160	

CTLABO	RATORI				Sa	mple Descrip	tion		
		1 INORGANIC ANALYSIS	DATA SHEET		SHAWO	)3-004-SO-01	6		
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	ES		
Matrix (soil/water):	SOIL		SDG No.:	133832	2				
% Solids:	88.5		Lab Sample ID:	979022	979022				
Analytical Method:	EPA 8000C		Date Received:	01/31/2018					
Dilution Factor:	_1.00		TCLP/SPLP Extraction	n Date/ti	me:				
Analytical Run #:	146330		Analysis Date/Time	02/	01/2018	12:00			
Analytical Prep Batch #:			Prep. Date/Time:						
ICAL Calibration #:			Concentration Units:	%	%				
CAS #	Analyte	Concentratio	on Qualifiers	DL	LOD	LOQ	RL		
SOLID Sol	ds, Percent	88.5		0.1	0.1	0.1	0.1		

CILHBO delivering mare than data fr	R H I O K I	alyses			Sa	mple Descrip	tion
		1 INORGANIC ANALYSIS D	ATA SHEET		SHAWO	03-004-SO-01	6
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	S
Matrix (soil/water):	SOIL		SDG No.:	133832	2		
% Solids:	88.5	I	ab Sample ID:	<u>979022</u>	2		
Analytical Method:	EPA 9045D	[	Date Received:	01/31/2018			
Dilution Factor:	_1	-	<b>FCLP/SPLP</b> Extraction				
Analytical Run #:	146373		Analysis Date/Time	02/	02/2018	12:27	
Analytical Prep Batch #:		F	Prep. Date/Time:				
ICAL Calibration #:			Concentration Units:	S.U	l.		
CAS #	Analyte	Concentration	n Qualifiers	DL	LOD	LOQ	RL
РН рН		5.69		0.1	0.1	0.1	0.1

E-15

		35			Sa	mple Descrip	tion	
	IN	1 IORGANIC ANALYSIS D	ATA SHEET	SHAW03-004-SO-016				
Lab Name:	CT Laboratories		Contract: MAXXAM	ANALYTIC	S-SI MULTI	PLE AFFF SITE	ES	
Matrix (soil/water):	SOIL		SDG No.:	133832	2			
% Solids:	88.5	L	ab Sample ID:	<u>979022</u>	2			
Analytical Method:	L-Kahn/9060A		Date Received:	01/31/2	2018			
Dilution Factor:	1.00		CLP/SPLP Extraction	n Date/ti	me: _			
Analytical Run #:	146428	ŀ	Analysis Date/Time	02/0	07/2018	14:23		
Analytical Prep Batch #		F	Prep. Date/Time:					
ICAL Calibration #:	TOCS ICA		Concentration Units:	mg/	/kg			
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL	
TOC To	tal Organic Carbon	361		41	85	170	170	

L I L I D U leitvering more than data fra	M I V N I C	lyans			Sa	mple Descript	tion		
		1 INORGANIC ANALYSIS DATA SHEET			SHAW03-004-SS-001				
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	S-SI MULTI	PLE AFFF SITE	S		
Matrix (soil/water):	SOIL		SDG No.:	133832	2				
% Solids:	91.6		Lab Sample ID:	<u>979021</u>	1				
Analytical Method:	EPA 8000C		Date Received:	01/31/2018					
Dilution Factor:	_1.00		TCLP/SPLP Extraction Date/time:						
Analytical Run #:	146330		Analysis Date/Time	9 02/01/2018 12:00					
Analytical Prep Batch #:			Prep. Date/Time:						
ICAL Calibration #:			Concentration Units:	%					
CAS #	Analyte	Concentratio	on Qualifiers	DL	LOD	LOQ	RL		
SOLID Soli	ds, Percent	91.6		0.1	0.1	0.1	0.1		

CTLABO	KHIUKIL) m your environmental analyse	ziysos			Sample Description					
	IN	1 INORGANIC ANALYSIS D.			SHAW03-004-SS-001					
Lab Name:	CT Laboratories	c	Contract: MAXXAM	ANALYTIC	S-SI MULTIF	PLE AFFF SITE	S			
Matrix (soil/water):	SOIL		DG No.:	133832	2					
% Solids:	91.6	L	ab Sample ID:	<u>979021</u>						
Analytical Method:	EPA 9045D	C	ate Received:	01/31/2018						
Dilution Factor:	1	т	CLP/SPLP Extraction	on Date/ti	me:					
Analytical Run #:	146373	A	nalysis Date/Time	02/0	02/2018	12:27				
Analytical Prep Batch #:		F	Prep. Date/Time:							
ICAL Calibration #:		C	Concentration Units:	S.U						
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL			
PH pH		6.21		0.1	0.1	0.1	0.1			

		36				Sa	mple Descrip	tion	
	IN	1 IORGANIC ANALYSIS D	ATA SHEE	T	SHAW03-004-SS-001				
Lab Name:	CT Laboratories		Contract:	MAXXAM AI	NALYTIC	S-SI MULTI	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL		SDG No.:		133832	2			
% Solids:	91.6	L	_ab Sample	e ID:	<u>979021</u>				
Analytical Method:	L-Kahn/9060A		Date Recei	ved:	01/31/2018				
Dilution Factor:	1.00	ר	TCLP/SPLP Extraction Date/time:						
Analytical Run #:	146428	ŀ	Analysis Da	ate/Time	02/0	07/2018	14:12		
Analytical Prep Batch #:		F	Prep. Date/	Time:					
ICAL Calibration #:	TOCS ICA		Concentrati	ion Units:	mg/	/kg			
CAS #	Analyte	Concentration	n Qual	lifiers	DL	LOD	LOQ	RL	
TOC To	tal Organic Carbon	7390			39	82	160	160	

elivering more than data from	n your environmental and	thyses		_	Sa	mple Descrip	tion	
		1 INORGANIC ANALYSIS	DATA SHEET	SHAW04-005-SO-013				
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	S-SI MULTI	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL		SDG No.:	133832	2			
% Solids:	95.4		Lab Sample ID:	<u>97902</u> 4	1			
Analytical Method:	EPA 8000C		Date Received:	01/31/2018				
Dilution Factor:	1.00		_ TCLP/SPLP Extraction Date/time:					
Analytical Run #:	146330		Analysis Date/Time	02/0	01/2018	12:00		
Analytical Prep Batch #:			Prep. Date/Time:					
ICAL Calibration #:			Concentration Units:	%				
CAS #	Analyte	Concentratio	on Qualifiers	DL	LOD	LOQ	RL	
SOLID Solid	ls, Percent	95.4		0.1	0.1	0.1	0.1	

kelivering more than data fra	K H I U K I E In your environmental anal	1/805		mple Descrip	e Description			
		ATA SHEET	SHAW04-005-SO-013					
Lab Name:	CT Laboratories	C	Contract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	ES	
Matrix (soil/water):	SOIL	S	DG No.:	133832	2			
% Solids:	95.4	L	ab Sample ID:	<u>97902</u> 4	1			
Analytical Method:	EPA 9045D	C	Date Received:	01/31/2018				
Dilution Factor:	_1	т	TCLP/SPLP Extraction Date/time:					
Analytical Run #:	146373	Δ	nalysis Date/Time	02/	02/2018	12:27		
Analytical Prep Batch #:		F	Prep. Date/Time:					
ICAL Calibration #:		C	Concentration Units:	S.U	J.			
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL	
РН рН		5.56		0.1	0.1	0.1	0.1	

leitvering more than data fr	M I I V K I L om your environmental analy	1000		Sample I				
		1 INORGANIC ANALYSIS L	DATA SHEET	SHAW04-005-SO-013				
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	ES	
Matrix (soil/water):	SOIL		SDG No.:	133832	2			
% Solids:	95.4		Lab Sample ID:	979024	1			
Analytical Method:	L-Kahn/9060A		Date Received:	01/31/2	2018			
Dilution Factor:	_1.00		TCLP/SPLP Extraction Date/time:					
Analytical Run #:	146428		Analysis Date/Time	02/	07/2018	15:10		
Analytical Prep Batch #:			Prep. Date/Time:					
ICAL Calibration #:	TOCS ICA		Concentration Units:	mg,	/kg			
CAS #	Analyte	Concentratio	n Qualifiers	DL	LOD	LOQ	RL	
TOC Tot	al Organic Carbon	267		38	79	160	160	

		5				Sa	mple Descrip	tion	
	IN	1 IORGANIC ANALYSIS DA	ATA SHEET		SHAW04-005-SS-001				
Lab Name:	CT Laboratories	C	ontract: MAX	XAM ANA	LYTICS	S-SI MULTII	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL	SI	DG No.:	<u>1</u>	33832				
% Solids:	93.7	La	ab Sample ID:	9	979023				
Analytical Method:	EPA 8000C	Da	ate Received:	<u>0</u>	01/31/2018				
Dilution Factor:	1.00	то	CLP/SPLP Ex	traction D	)ate/tim	ie: _			
Analytical Run #:	146330	A	nalysis Date/T	īme	02/0	1/2018	12:00		
Analytical Prep Batch #	:	P	rep. Date/Time	e: –					
ICAL Calibration #:		C	oncentration L	Jnits:	%				
CAS #	Analyte	Concentration	Qualifier	s D	DL	LOD	LOQ	RL	
SOLID So	olids, Percent	93.7		0	0.1	0.1	0.1	0.1	

elivering more than data from	your environmental analyses	anahrsos 1			Sample Description				
	INORGA	NIC ANALYSIS D	ATA SHEET		SHAW	04-005-SS-00 <sup>-</sup>	1		
Lab Name:	CT Laboratories	(	Contract: MAXXAM	ANALYTIC	S-SI MULTIF	PLE AFFF SITE	S		
Matrix (soil/water):	SOIL	S	DG No.:	133832	2				
% Solids:	93.7	L	ab Sample ID:	<u>979023</u>	3				
Analytical Method:	EPA 9045D	C	ate Received:	01/31/2018					
Dilution Factor:	1	т	CLP/SPLP Extraction	on Date/tir	me:				
Analytical Run #:	146373	A	nalysis Date/Time	02/0	02/2018	12:27			
Analytical Prep Batch #:		F	Prep. Date/Time:						
ICAL Calibration #:		(	Concentration Units:	S.U	l.				
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL		
PH pH		5.28		0.1	0.1	0.1	0.1		

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		76			Sa	ample Descrip	otion	
	IN	1 ORGANIC ANALYSIS D	ATA SHEET		SHAW	/04-005-SS-00	01	
Lab Name:	CT Laboratories	(	Contract: MAX	XAM ANAL	YTICS-SI MULT	IPLE AFFF SIT	ES	
Matrix (soil/water):	SOIL		SDG No.:	<u>133</u>	3832			
% Solids:	93.7	L	ab Sample ID:	<u>979</u>	979023			
Analytical Method:	L-Kahn/9060A		Date Received:	<u>01/</u>	01/31/2018			
Dilution Factor:	1.00	ן	CLP/SPLP Ext	raction Da	te/time:			
Analytical Run #:	146428	ŀ	Analysis Date/Ti	ime	02/07/2018	14:52		
Analytical Prep Batch #:		F	Prep. Date/Time	):				
ICAL Calibration #:	TOCS ICA		Concentration U	Inits:	mg/kg			
CAS #	Analyte	Concentration	Qualifiers	s DL	LOD	LOQ	RL	
TOC To	tal Organic Carbon	2000		38	80	160	160	

delivering more than data fro	N N I V N I I sm your environmental and	alyses		_	Sa	mple Descript	tion	
		1 INORGANIC ANALYSIS I	DATA SHEET	SHAW05-005-SO-031				
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	CS-SI MULTI	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL		SDG No.:	133832	2			
% Solids:	94.8		Lab Sample ID:	<u>979026</u>	6			
Analytical Method:	EPA 8000C		Date Received:	01/31/2018				
Dilution Factor:	1.00		TCLP/SPLP Extraction	n Date/ti	me:			
Analytical Run #:	146330		Analysis Date/Time	02/	01/2018	12:00		
Analytical Prep Batch #:			Prep. Date/Time:					
ICAL Calibration #:			Concentration Units:	%				
CAS #	Analyte	Concentratio	n Qualifiers	DL	LOD	LOQ	RL	
SOLID Soli	ids, Percent	94.8		0.1	0.1	0.1	0.1	

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LILNDU	KHIUKIL om your environmental analys	505			Sa	mple Descrip	tion
	h	1 NORGANIC ANALYSIS DA	TA SHEET		SHAWO	)5-005-SO-03	1
Lab Name:	CT Laboratories	Cc	ontract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	S
Matrix (soil/water):	SOIL	SE	OG No.:	133832	2		
% Solids:	94.8	La	b Sample ID:	979026			
Analytical Method:	EPA 9045D	Da	te Received:	01/31/2018			
Dilution Factor:	_1	тс	CLP/SPLP Extraction	n Date/tii	me:		
Analytical Run #:	146373	Ar	alysis Date/Time	02/0	02/2018	12:27	
Analytical Prep Batch #:		Pr	ep. Date/Time:				
ICAL Calibration #:		Cc	oncentration Units:	S.U	l.		
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL
PH pH		5.99		0.1	0.1	0.1	0.1

delivering more than data fro	m your environmental and	alyses		Sample Description				
		1 INORGANIC ANALYSIS D	ATA SHEET		SHAW	05-005-SO-03	1	
Lab Name:	CT Laboratories		Contract: MAXXAM A	ANALYTIC	CS-SI MULTI	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL		SDG No.:	133832	2			
% Solids:	94.8	I	_ab Sample ID:	979026				
Analytical Method:	L-Kahn/9060A	[	Date Received:	01/31/2018				
Dilution Factor:	1.00		CLP/SPLP Extractio	n Date/ti	me:			
Analytical Run #:	146428		Analysis Date/Time	02/	07/2018	15:27		
Analytical Prep Batch #:		I	Prep. Date/Time:					
ICAL Calibration #:	TOCS ICA		Concentration Units:	mg,	/kg			
CAS #	Analyte	Concentration	n Qualifiers	DL	LOD	LOQ	RL	
TOC Tota	l Organic Carbon	128	J	38	79	160	160	

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		5			Sa	mple Descript	tion	
	IN	1 IORGANIC ANALYSIS DA	TA SHEET		SHAW	05-005-SS-00 <sup>-</sup>	1	
Lab Name:	CT Laboratories	Co	ontract: MAXXAM A	NALYTIC	S-SI MULTI	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL	SI	DG No.:	133832	2			
% Solids:	90.5	La	b Sample ID:	979025	979025			
Analytical Method:	EPA 8000C	Da	ate Received:	01/31/2018				
Dilution Factor:	_1.00	тс	CLP/SPLP Extraction	n Date/ti	me: _			
Analytical Run #:	146330	Ar	nalysis Date/Time	02/0	01/2018	12:00		
Analytical Prep Batch	#:	Pr	ep. Date/Time:					
ICAL Calibration #:		Co	oncentration Units:	%				
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL	
SOLID S	olids, Percent	90.5		0.1	0.1	0.1	0.1	

		5				Sa	mple Descrip	tion
	11	1 NORGANIC ANALYSIS D.	ATA SHEET			SHAW	)5-005-SS-00	1
Lab Name:	CT Laboratories	(	Contract: MAX	XAM ANA	ALYTICS	S-SI MULTII	PLE AFFF SITE	S
Matrix (soil/water):	SOIL		DG No.:	<u>1</u>	33832			
% Solids:	90.5	L	ab Sample ID:	9	979025			
Analytical Method:	EPA 9045D	C	Date Received:	<u>0</u>	01/31/2018			
Dilution Factor:	1	т	CLP/SPLP Ex	traction E	Date/tim	ne: _		
Analytical Run #:	146373	<u>م</u>	nalysis Date/T	īme _	02/0	2/2018	12:27	
Analytical Prep Batch #:		F	Prep. Date/Time	e:				
ICAL Calibration #:		C	Concentration l	Jnits:	S.U.			
CAS #	Analyte	Concentration	Qualifier	s [	DL	LOD	LOQ	RL
РН рН		6.06		C	).1	0.1	0.1	0.1

elivering more than data from	n your environmental analyse	96				Sa	mple Descrip	tion
	IN	1 ORGANIC ANALYSIS I	DATA SHE	ET		SHAW	05-005-SS-00	1
Lab Name:	CT Laboratories		Contract:	MAXXAM A	NALYTIC	S-SI MULTI	PLE AFFF SITE	ES
Matrix (soil/water):	SOIL		SDG No.:		133832	2		
% Solids:	90.5		Lab Sampl	e ID:	979025			
Analytical Method:	L-Kahn/9060A		Date Recei	ved:	01/31/2018			
Dilution Factor:	1.00		TCLP/SPL	P Extractior	n Date/tii	me: _		
Analytical Run #:	146428		Analysis D	ate/Time	02/0	07/2018	15:19	
Analytical Prep Batch #:			Prep. Date	/Time:				
ICAL Calibration #:	TOCS ICA		Concentrat	ion Units:	mg/	kg		
CAS #	Analyte	Concentratio	n Qua	lifiers	DL	LOD	LOQ	RL
TOC Total	Organic Carbon	5590			40	83	170	170

CTLABO delivering more than data fro	RATORI myour environmental and	alyses			Sa	mple Descrip	tion	
		1 INORGANIC ANALYSIS	DATA SHEET	SHAW06-004-SO-027				
Lab Name:	CT Laboratories		Contract: MAXXAM A	NALYTIC	S-SI MULTI	PLE AFFF SITE	S	
Matrix (soil/water):	SOIL		SDG No.:	133832	2			
% Solids:	80.9		Lab Sample ID:	979028	3			
Analytical Method:	EPA 8000C		Date Received:	01/31/2018				
Dilution Factor:	1.00		TCLP/SPLP Extraction	n Date/ti	me:			
Analytical Run #:	146330		Analysis Date/Time	02/	01/2018	12:00		
Analytical Prep Batch #:			Prep. Date/Time:					
ICAL Calibration #:			Concentration Units:	%				
CAS #	Analyte	Concentratio	on Qualifiers	DL	LOD	LOQ	RL	
SOLID Solid	ds, Percent	80.9		0.1	0.1	0.1	0.1	

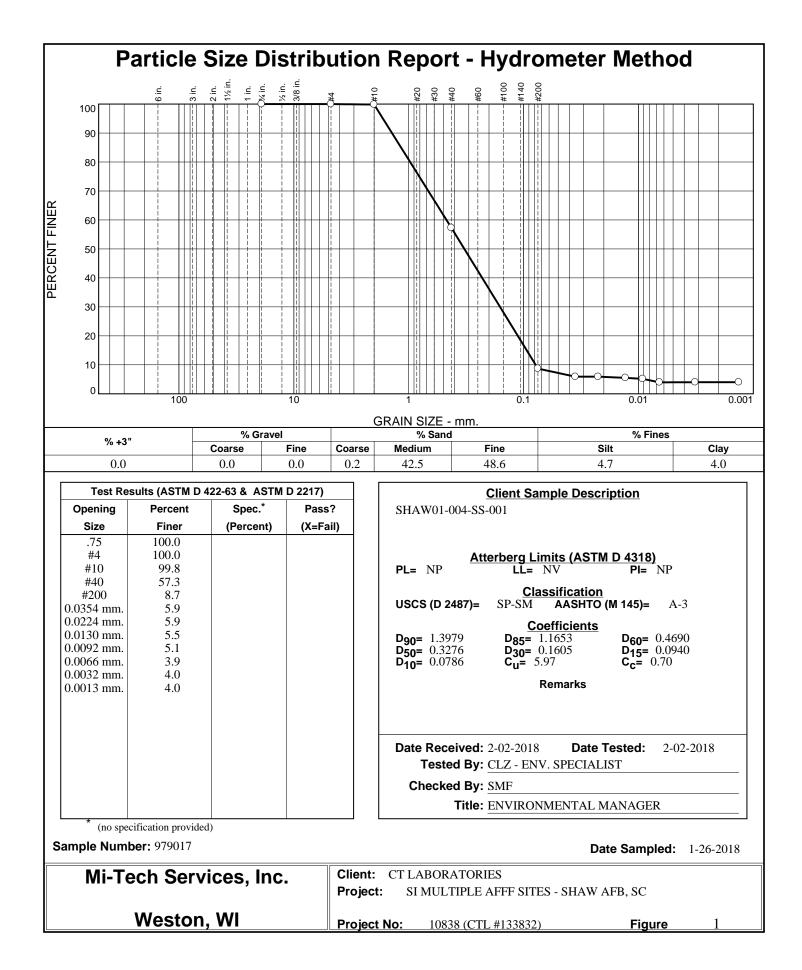
leitvering more than data fr	K H I V K I C om your environmental and	lysos			Sa	mple Descrip	tion
		1 INORGANIC ANALYSIS DA	ATA SHEET		SHAWO	)6-004-SO-02	7
Lab Name:	CT Laboratories	c	ontract: MAXXAM A	NALYTIC	S-SI MULTIF	PLE AFFF SITE	S
Matrix (soil/water):	SOIL	S	DG No.:	133832	2		
% Solids:	80.9	La	ab Sample ID:	979028			
Analytical Method:	EPA 9045D	D	ate Received:	01/31/2018			
Dilution Factor:	_1	T	CLP/SPLP Extraction	n Date/ti	me:		
Analytical Run #:	146373	A	nalysis Date/Time	02/	02/2018	12:27	
Analytical Prep Batch #:		P	rep. Date/Time:				
ICAL Calibration #:		c	oncentration Units:	S.U	J.		
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL
РН рН		4.67		0.1	0.1	0.1	0.1

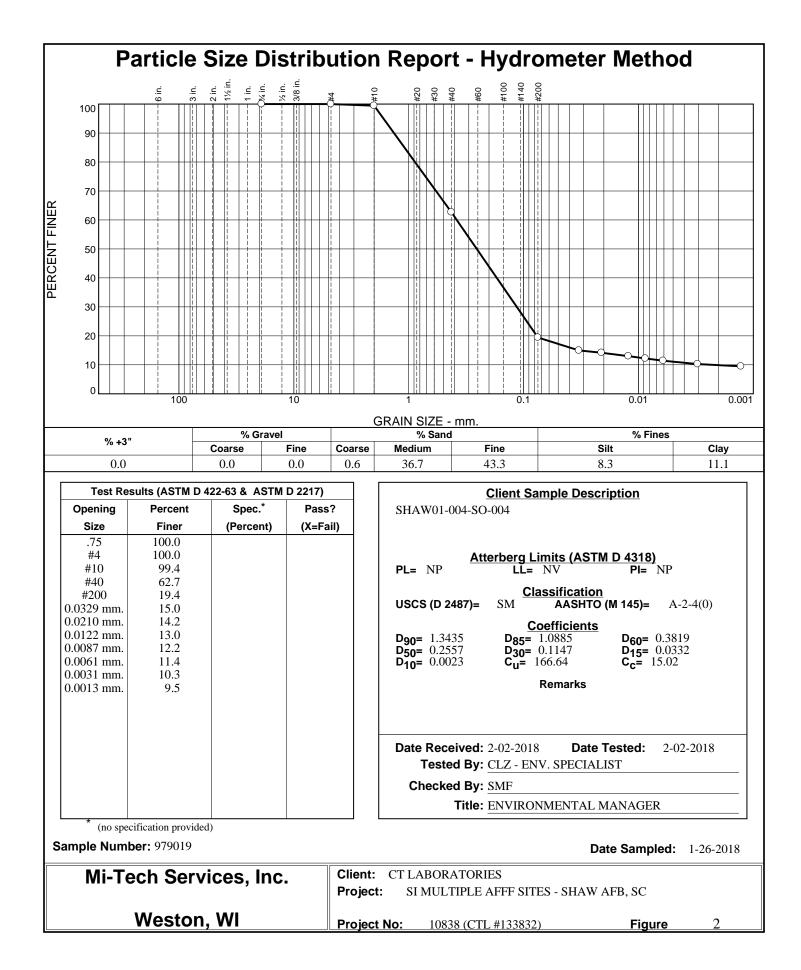
leitvering more than data fr	K H I U K I L om your environmental analy	1806			Sar	mple Descrip	tion
		1 INORGANIC ANALYSIS	DATA SHEET		SHAWO	6-004-SO-02	7
Lab Name:	CT Laboratories		Contract: MAXXAM	ANALYTIC	S-SI MULTIF	PLE AFFF SITE	S
Matrix (soil/water):	SOIL		SDG No.:	133832	2		
% Solids:	80.9		Lab Sample ID:	979028			
Analytical Method:	L-Kahn/9060A		Date Received:	01/31/2018			
Dilution Factor:	1.00		TCLP/SPLP Extraction	on Date/ti	me:		
Analytical Run #:	146428		Analysis Date/Time	02/	07/2018	16:10	
Analytical Prep Batch #:			Prep. Date/Time:				
ICAL Calibration #:	TOCS ICA		Concentration Units:	mg,	/kg		
CAS #	Analyte	Concentratio	on Qualifiers	DL	LOD	LOQ	RL
TOC Tot	al Organic Carbon	112	J	44	93	190	190

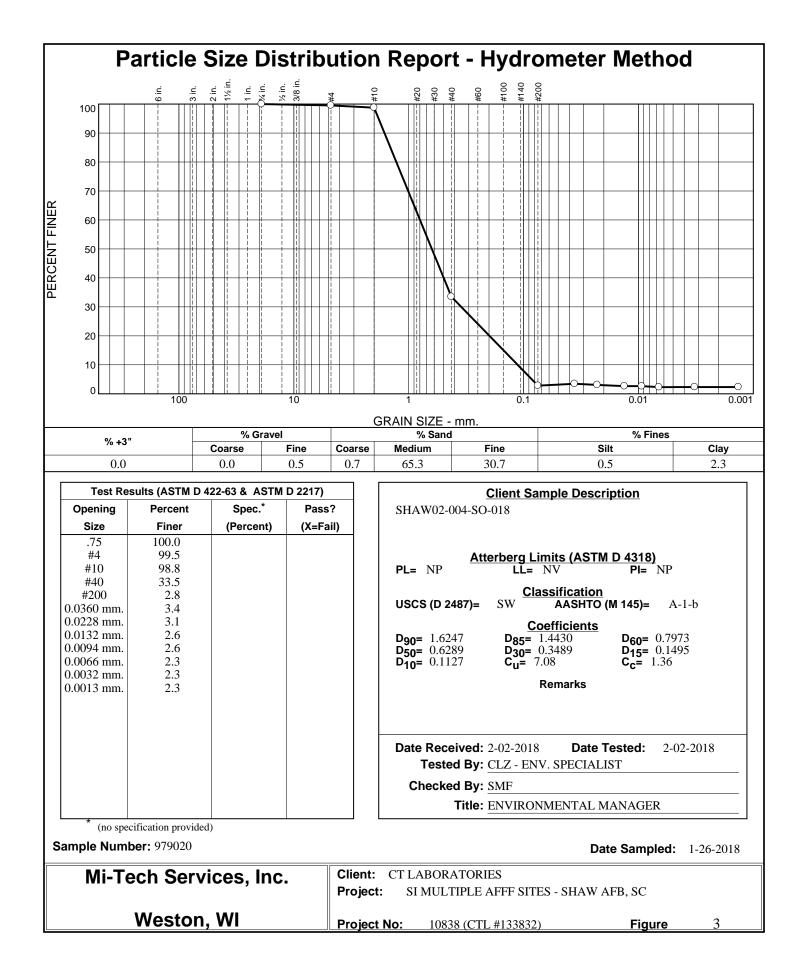
		5			S	ample Descrip	otion	
	IN	1 IORGANIC ANALYSIS DA	ATA SHEET		SHAV	V06-004-SS-00	01	
Lab Name:	CT Laboratories	c	ontract: MAX	XAM ANAL	YTICS-SI MULT	IPLE AFFF SIT	ES	
Matrix (soil/water):	SOIL	S	DG No.:	<u>13</u>	3832			
% Solids:	84.5	La	ab Sample ID:	<u>979</u>	979027			
Analytical Method:	EPA 8000C	D	ate Received:	01/	01/31/2018			
Dilution Factor:	_1.00	T	CLP/SPLP Ext	raction Da	te/time:			
Analytical Run #:	146330	Α	nalysis Date/Ti	ime	02/01/2018	12:00		
Analytical Prep Batch	#:	P	rep. Date/Time	): 				
ICAL Calibration #:		С	oncentration U	Inits:	%			
CAS #	Analyte	Concentration	Qualifiers	s DL	LOD	LOQ	RL	
SOLID S	Solids, Percent	84.5		0.1	0.1	0.1	0.1	

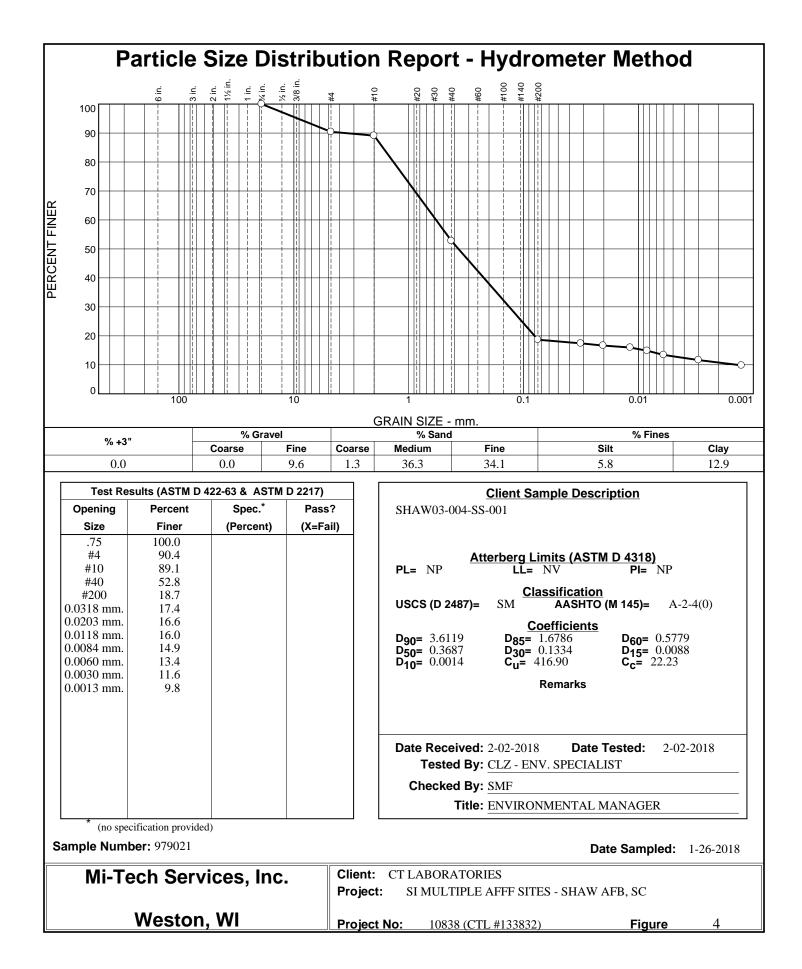
elivering more than data from	your environmental analyses	Sample Description						
	INOR		SHAW06-004-SS-001					
Lab Name:	CT Laboratories	(	Contract: MAXXAM	ANALYTIC	ALYTICS-SI MULTIPLE AFFF SITES			
Matrix (soil/water):	(soil/water): SOIL				SDG No.: <u>133832</u>			
% Solids:	84.5	L	ab Sample ID:	979027				
Analytical Method:	EPA 9045D	C	Date Received:	01/31/2018				
Dilution Factor:	1	т	CLP/SPLP Extraction	n Date/time:				
Analytical Run #:	146373	Α	Analysis Date/Time		02/02/2018 12:27			
Analytical Prep Batch #:		F	Prep. Date/Time:					
ICAL Calibration #:		(	Concentration Units:	S.U.				
CAS #	Analyte	Concentration	Qualifiers	DL	LOD	LOQ	RL	
PH pH		5.40		0.1	0.1	0.1	0.1	

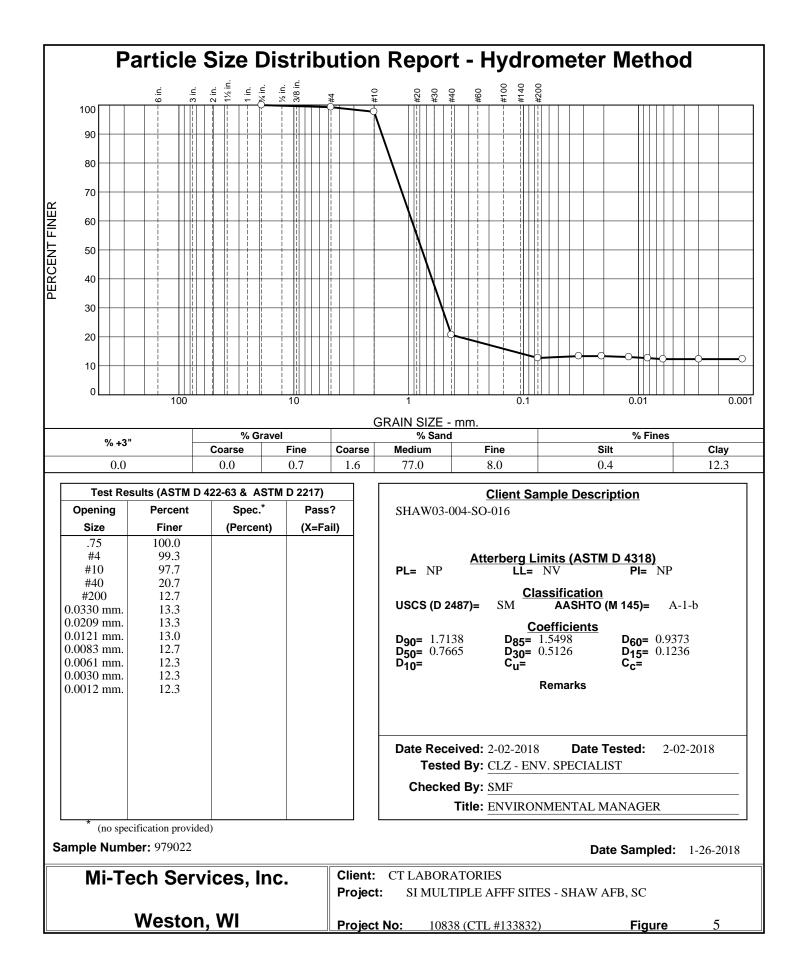
CTLABO delivering mare than data from		Sample Description							
	IN	DATA SHE	ET	SHAW06-004-SS-001					
Lab Name:	CT Laboratories	Contract: MAXXAM ANALYTICS-SI MULTIPLE					ES		
Matrix (soil/water):	SOIL		SDG No.:		<u>133832</u> 979027				
% Solids:	84.5		Lab Sampl	e ID:					
Analytical Method:	L-Kahn/9060A		Date Rece	ved:	01/31/2018				
Dilution Factor:	lution Factor: <u>1.00</u>					on Date/time:			
Analytical Run #:	146428		Analysis D	ate/Time	02/0	07/2018	16:03		
Analytical Prep Batch #:			Prep. Date	/Time:					
ICAL Calibration #:	TOCS ICA		Concentration Units:			/kg			
CAS #	Analyte	Concentratio	n Qua	lifiers	DL	LOD	LOQ	RL	
TOC Tota	l Organic Carbon	3580			43	89	180	180	

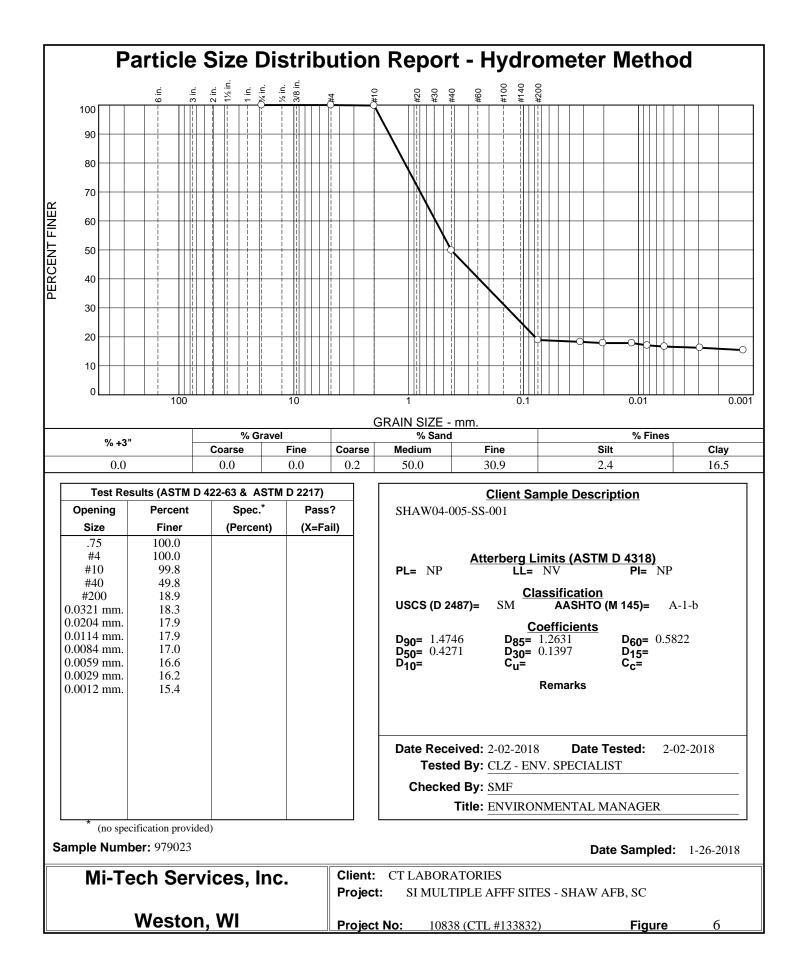


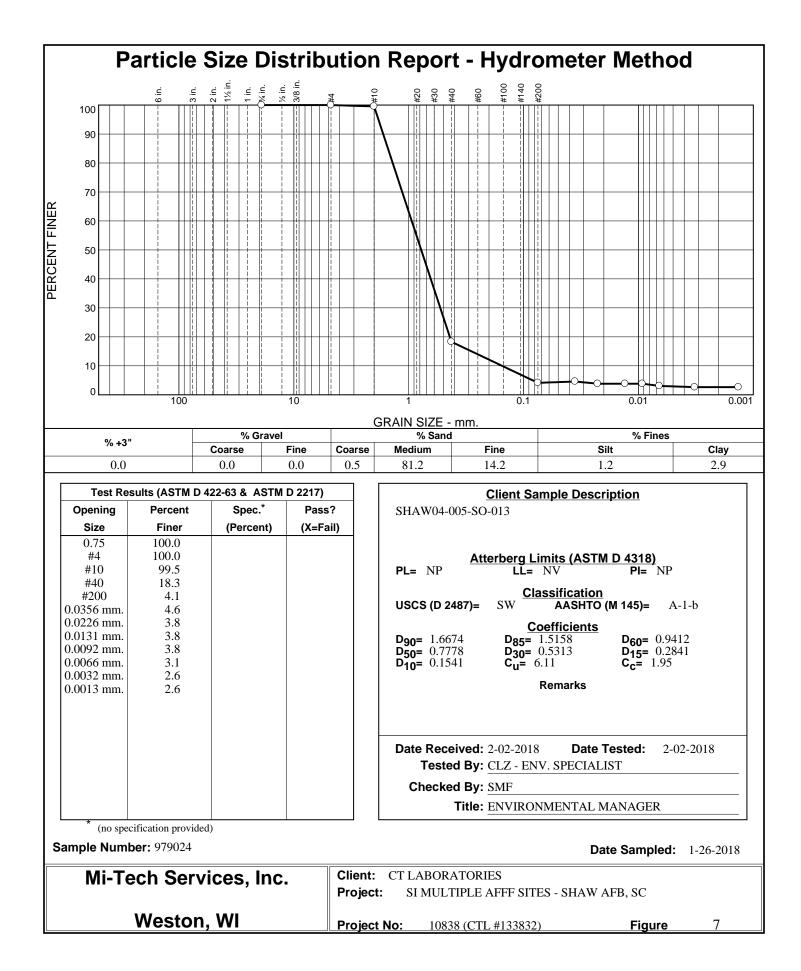


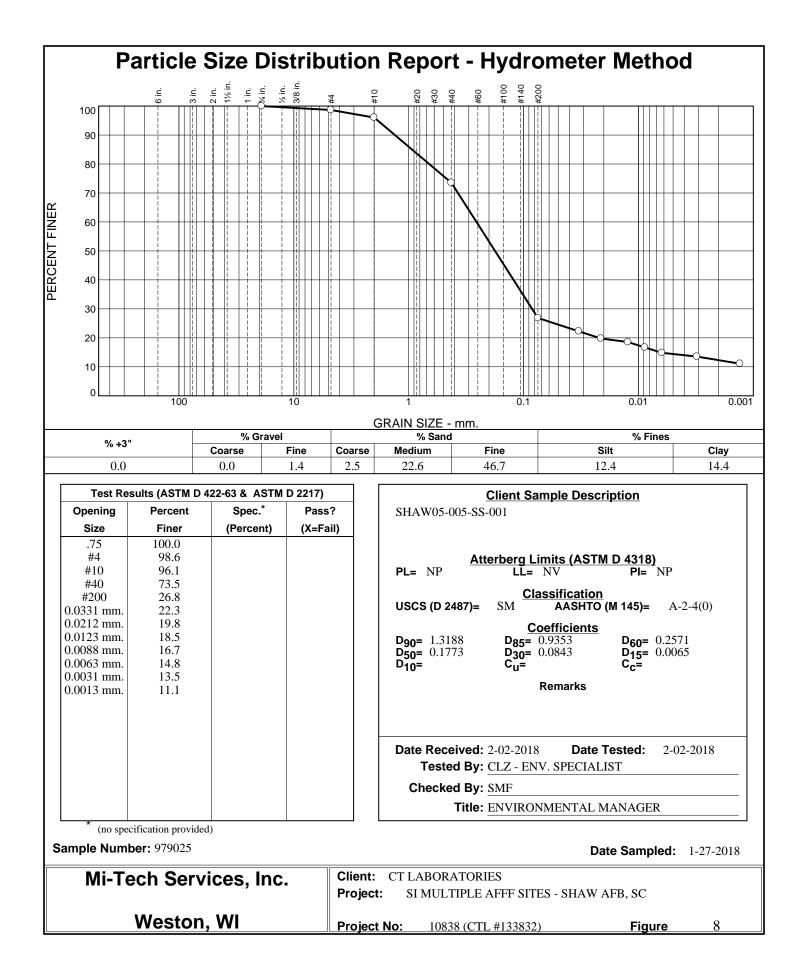


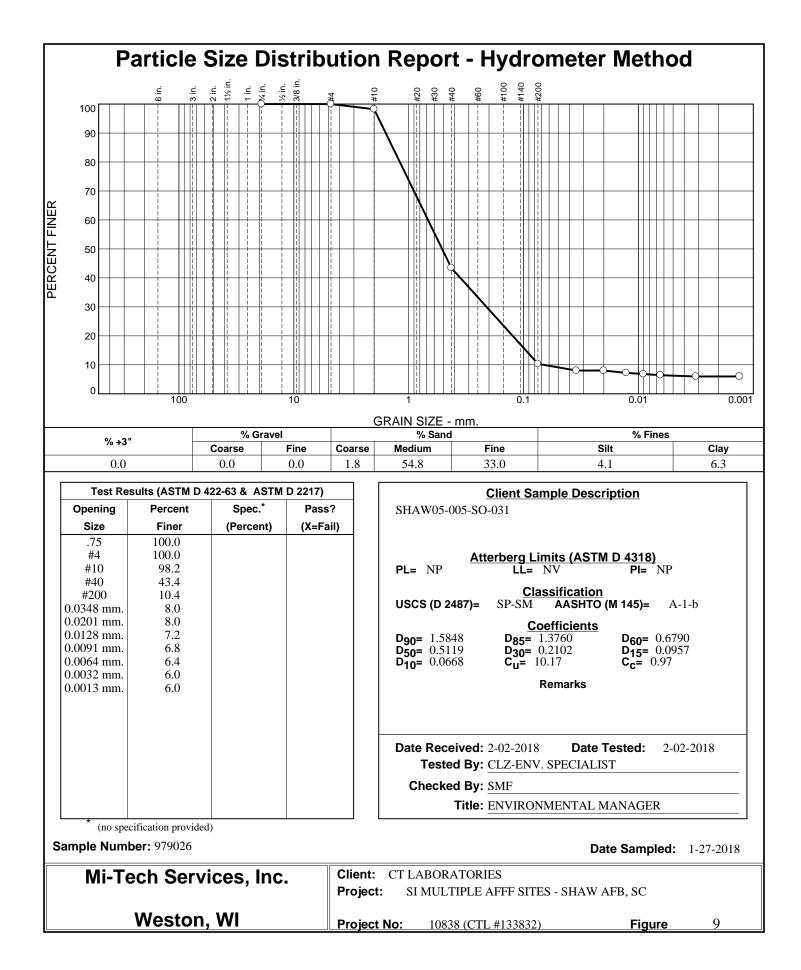


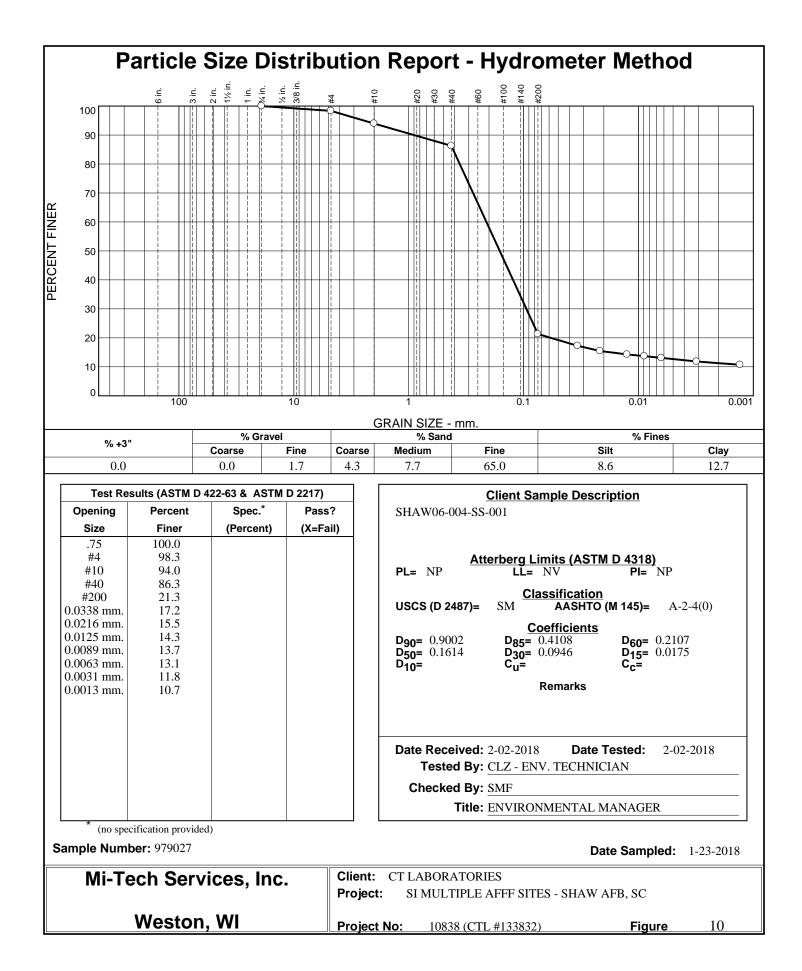


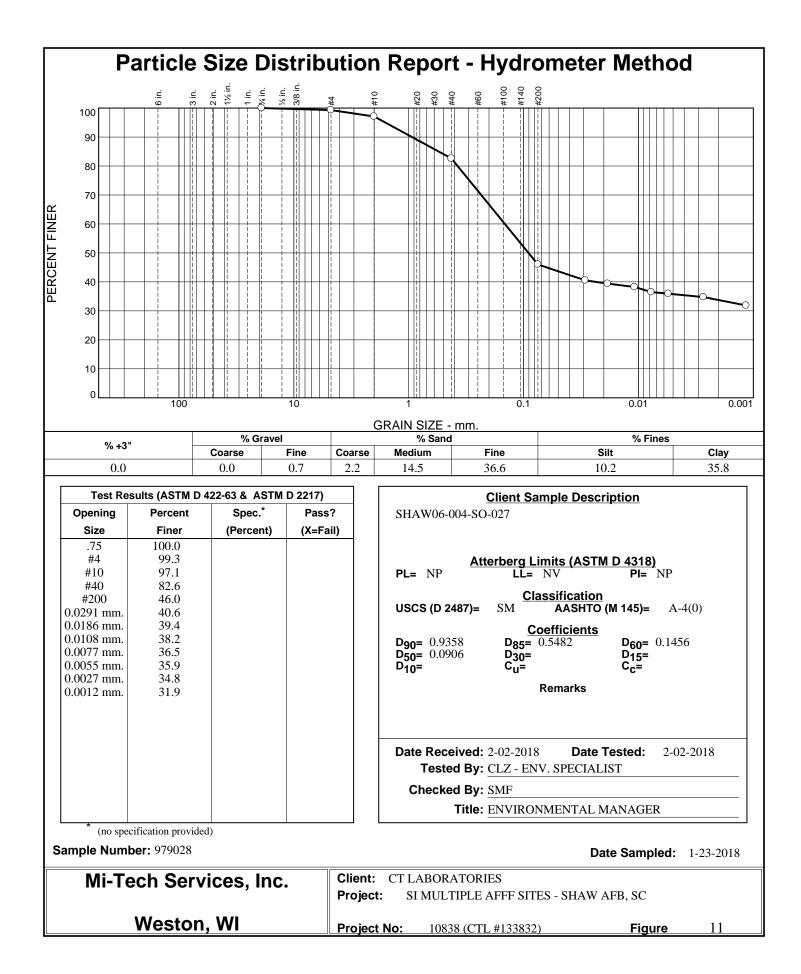














## Sub-Contract Laboratory Chain-of-Custody and Purchase Order

Ирол Ресеј	ot of Samples, please varify i temperature,	that samples were rac upon receipt, must b	eived in acceptable condition then sign this ( e recorded on this document unless thermal)	form and fax to (608)356-2766 or email to the project preservation is not a method requirement.	menager. Samp
	IFTech 707 SCHOFIELD AVE		Return Invoice and F	Results to: ekorthals@ctlaboratories.com	п
V	VESTON WI \$4476	Gov	ernment UPS Shipping Acct 7 Y	N CTLaboratories	
hip by: Sp	eedee 🔀 UPS Gr	nd 🗌 UPS	2nd 🔲 UPSINDA 🗍	Eric Korthals 1230 Lenge Court	
• • •				Baraboo WI 53913	
ate Due:	WEEKS	RUSH TURNAR	OUND NEEDED? Y or CYCircle Or	7 <del>0</del> ,	
roject Name		SITES - SHAW	AFB Project State: SC		
oject name	STRUCTIFLE AFF	01100 01111	ridjact state,	-	
nslytical/QC	Criteria: CNONE INI	TICATE	STATE DODIQSM NE	ELAP (Circle one) OTHER	
eport results	as EDD N Y	/Fuels and and in	dicate type	Data Deliverable Package LEVEL SLd	
applicitasuna		Concie one and in		Data Derverable Package LEVEC	
TLabs IO#	Sample Date/Time	Matrix	Sample Description	Analyses / Method	Cos
	Sample Date/Time 01/26/2018 1520	Matrix SOIL	Sample Description	Analyses / Method	Cos
79017					Cos
79017 79019	01/26/2018 1620	SOIL	SI (AW01-004-SS-001	INDROMETER / CSA	Cos
79017 79019 79020	01/26/2018 1620 01/26/2016 1630	SOIL	SEAW01-004-SS-001 SEAW01-004-SQ-004	HYDROMETER / CSA	Cos
79017 79019 79020 79021	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545	SOIL SOIL SOIL	SEAW01-004-SS-001 SEAW01-004-S(1-004 SEAW02-004-SO-018	HYDROMETER / CSA HYDROMETER HYDROMETER	Cos
79017 79019 79020 79021 79022	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545 01/26/2018 1345	SOIL SOIL SOIL SOII	SFAW01-004-SS-001 SFAW01-004-S01-004 SFAW02-004-SO-018 SFAW03-004-S5-001	INDROMETER / CSA HYDROMETER HYDROMETER HYDROMETER	Cos
079017 079019 079020 079021 079022 079023	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545 01/26/2018 1345 01/26/2018 1420	SOIL SOIL SOIL SOIL SOIL	SI (AW01-004-SS-001 SEAW01-004-S(1-004 SEAW02-004-SO-018 SEAW03-004-SS-001 SI (WW03-004-SS-016	HYDROMETER / CSA HYDROMETER HYDROMETER HYDROMETER HYDROMETER	Cos
79017 79019 79020 79021 79022 79023 79023	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545 01/26/2018 1345 01/26/2018 1420 01/26/2018 0910	SOIL SOIL SOIL SOII SOIL SOIL	SFAW01-004-SS-001 SFAW01-004-SS-004 SFAW02-004-SO-018 SFAW03-004-SS-001 SFAW03-004-SO-016 SFAW04-005-SS-001	INVOROMETER / CSA HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER	Cos
79017 79019 79020 79021 79022 79023 79023 79025	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545 01/26/2018 1345 01/26/2018 1420 01/26/2018 1420 01/26/2018 1030	SOIL SOIL SOIL SOIL SOIL SOIL SOIL	SI (AW01-004-SS-001 SEAW01-004-S(1-004 SEAW02-004-SO-018 SEAW03-004-SS-001 SI (WW03-004-SO-016 SEAW04-005-SS-001 SI (WW04-005-SO-013	INDROMETER / CSA HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER	Cos
979017 979019 979020 979021 979022 979023 979023 979025 979025	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545 01/26/2018 1345 01/26/2018 1420 01/26/2018 0910 01/26/2018 1030 01/27/2018 0950	SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL	SI (AW01-004-SS-001 SEAW01-004-SS-001 SEAW02-004-SO-018 SEAW03-004-SS-001 SI (AW03-004-SS-001 SEAW04-005-SS-001 SI (AW05-005-SS-001	INVOROMETER / CSA HYOROMETER HYOROMETER HYOROMETER HYOROMETER HYOROMETER HYOROMETER HYOROMETER	Cos
TLabs ID# 979017 979019 979020 979021 979022 979023 979023 979025 979025 979025	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545 01/26/2018 1345 01/26/2018 1420 01/26/2018 1420 01/26/2018 1030 01/27/2018 0950 01/27/2018 1010	SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL	SI (AW01-084-SS-001 SHAW01-084-SS-001 SHAW02-004-SO-018 SHAW03-004-SS-001 SHAW03-004-SS-001 SHAW04-085-SS-001 SHAW05-005-SS-001 SHAW05-005-SS-001	INDROMETER / CSA HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER	
979017 979019 979020 979021 979022 979023 979023 979025 979025 979026 979026 979028	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545 01/26/2018 1345 01/26/2018 1420 01/26/2018 1420 01/26/2018 1030 01/27/2018 0950 01/27/2018 1010 01/23/2018 1430 01/23/2018 1500	SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL	SI (AW01-004-SS-001 SEAW01-004-SS-001 SEAW02-004-SO-018 SEAW03-004-SS-001 SEAW04-005-SS-001 SEAW04-005-SS-001 SEAW05-005-SS-001 SEAW05-005-SS-001 SEAW05-005-SS-001 SEAW05-004-SS-001	IryDROMETER / CSA HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER HYDROMETER	Co:
979017 979019 979020 979021 979022 979023 979023 979025 979025 979026 979026	01/26/2018 1620 01/26/2018 1630 01/26/2018 1545 01/26/2018 1345 01/26/2018 1420 01/26/2018 0910 01/26/2018 1030 01/27/2018 0950 01/27/2018 1010 01/23/2018 1430	SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL	SI (AW01-004-SS-001 SEAW01-004-SS-001 SEAW02-004-SO-018 SEAW03-004-SS-001 SEAW04-005-SS-001 SEAW04-005-SS-001 SEAW05-005-SS-001 SEAW05-005-SS-001 SEAW05-005-SS-001 SEAW05-004-SS-001	INVOROMETER / CSA HYOROMETER HYOROMETER HYOROMETER HYOROMETER HYOROMETER HYOROMETER HYOROMETER HYOROMETER	Cos

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Rev. 02/2017 CHAIN OF CU					CUSTO	STODY						Page of						
Company: Aeroster SES LLC							ł		1230 Lar					Report To	: Jen	ny b	lance aerostar.net	
Project Contact: Brian Odom					D	DIFC 608-356-2760 Fax 608-356-2766 www.ctlaboratories.com						Company: Aerostare SESLLC						
Telepho	hone: 4/8-39 1-990 9 Folder #: 123822				~~* <b>*</b> *	****	****	*****	Program:					Address: Oal	100 K Ki	le Fi do	R SESLIC Voyd Culler Ct TN 37850	
Project	Name:S Site	IMU	stiple	AFFF	Company: MAXXAM	NALY				Address: 1006 Floyd Culler Ct Oak Ridge, TN 37830 Invoice To:* Brian Odom			Odom					
Project	#: M2	>. >32.<	)00(		Project SI MULTIPLE	AFFF	FFF SITE				EMAIL: bodonespeqproenv.com Company: Acrostace SES LCC							
Location: Shaw AFB Sumfer, SC			M: E	Т	-1	4111	PO #					Address: See above						
	s.ur d By: ரு.				***************************************	*****	****	****	****	M203			resnonci	ble for no	ment of invo	ice as r	per CT	Laboratories' terms and conditions
Client Sp	Client Special Instructions				y Y				ALYSES F					-		Normal RUSH*		
							Q		$  \setminus$							ers	MS/MSD	Date Needed: Rush analysis requires prior
						z	Subhydroneter,									Containers		CT Laboratories' approval
						Filtered? Y/N	ron	GRAIN								-	Designated	Surcharges: 24 hr 200%
Matrix:						erec	1×4	KP 1								Total #	signe	2-3 days 100%
GW – grou S - soil/sed		<b>V</b> - surfac sludge		VW - was \ - air	tewater <b>DW</b> - drinking water <b>M</b> - misc/waste	l iii	31	9								Tot	De	4-9 days 50%
Colle Date	ction Time	Matrix	Grab/ Comp	Sample #	Sample ID Description		Fill in Spaces with Bottles per Test					t CT Lab ID #						
1/26/18	1620	5	Comp	1	SHAWOI-004-55-001	N	X	X			TX					2		979017
1/26/18		5	Comp	۱	5HAWDI-004-50-004	1	X	X					$\square$			2		979019
	1545	5	Comp	ι	5HAW02-004-50-018	·	X	X					$\lambda$			2		979020
1/26/18		5	COMP		SHAW03-004-55-001		X	X	<u> </u>				$\mathbb{R}/$			2		979021
1/26/18		5	(omp	1	5419203-004-50-016	_	X	X				+	ЧX			2		929022
1/26/18		S	COMP	1	5HAW04-005-55-00		X	+					$\square$	$\downarrow$		2		979023
1/26/18		S	COMP		SHAW64-005-50-01		X					_		$\rightarrow$		2		979024
1/27/18		5	Comp		SHAW05-005-55-60		ĻΧ	X							$\setminus$ $\vdash$	2		979025
1/27/12		5	Comp	1	SHAW05-005-50.03										$-\lambda$	2		
1/23/18	1430	5	COMP		SHAWO6-004-55-00 1	.	X	1				_			-+	1		979027
1/23/18	1500	2	Comp	1	SHAWOB-004-56-027		× X	X			+ $+$	-		5++		120		979028
Delineviah	ad Dur				Date/Time		eived			<u> </u>				Date/Time		REF	₽ <u>~</u>	Lab Use Only
Relinguish			6		) 1/30/12 / 800	Kec	erved	бу:			il	2		11311	0 101	5	lce	Present (Yes) No
Received t	<u>כון וי</u>	$\neg$	19	2		Rec	eived	for La	borat	ory by:	7	2	r I	Date/Time	\$		1	mp 0.1 IR Gun 20
Received i	<i>.</i> ,				Date/ Time	het	liveu		Jorat	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0		R	1737/1	, hZ	9	1	oler#&X
	M2032.00	01						_	E-5						<u> </u>			7/12/18

## Appendix F Groundwater Level Measurements

		aNorthing	aFosting	<sup>b</sup> Measuring Point Elevation	Screened	Maagunamant	Depth to Groundwater	Depth to Groundwater	Groundwater Surface
AFFF Area Name	Location Number	<sup>a</sup> Northing (feet)	<sup>a</sup> Easting (feet)	(feet/NAVD88)	Interval (feet/bgs)	Measurement Date	(feet/btoc)	(feet/bgs)	Elevation (feet/NAVD88)
	MW-105	782128.64	2166711.42	214.22	30.2 40.0	1/29/2018	13.63	11.97	200.59
AFFF Area 1 Former FTA 1	MW-121A	782037.40	2166440.31	217.92	12.0-22.0	1/29/2018	15.82	13.00	202.10
FOILIEI FIA I	MW-122A	781993.04	2166558.77	217.55	14.7-24.7	1/29/2018	16.18	13.85	201.37
	SHAW02-MW001	778794.81	2163433.83	223.16	14.8-24.8	1/29/2018	18.36	18.08	204.80
AFFF Area 2 Former FTA 2	SHAW02-MW002	778843.56	2163512.41	222.74	14.8-24.8	1/29/2018	17.87	17.66	204.87
FOILIEI FTA 2	SHAW02-MW003	778735.26	2163484.49	222.72	14.8-24.8	1/29/2018	17.91	17.78	204.81
	SHAW03-MW001	778989.58	2164878.30	218.40	9.8-19.8	1/29/2018	15.52	13.78	202.88
AFFF Area 3	SHAW03-MW002	779001.65	2164790.81	217.93	9.8-19.8	1/29/2018	14.52	12.96	203.41
Former FTA 3/ Current EOD Area	SHAW03-MW003	779032.18	2164854.95	218.25	9.8-19.8	1/29/2018	15.18	13.43	203.07
Current EOD Alea	FT3MW-5	778878.07	2164845.00	218.05	5.15-14.9	1/29/2018	15.14	12.30	202.91
	SHAW04-MW001	777900.03	2164211.39	217.42	9.8-19.8	1/29/2018	14.14	11.35	203.28
AFFF Area 4	SHAW04-MW002	777997.28	2164264.51	217.14	9.8-19.8	1/29/2018	13.65	11.23	203.49
Current FTA	SHAW04-MW003	777929.60	2164311.15	215.60	9.8-19.8	1/29/2018	12.53	11.10	203.07
	SHAW05-MW001	780959.39	2159616.48	252.90	10.3-25.3	1/31/2018	DRY	DRY	DRY
AFFF Area 5	SHAW05-MW002	781102.62	2159828.91	252.57	19.8-34.8	1/31/2018	25.57	25.39	227.00
Building 1511	SHAW05-MW003	780574.38	2160392.04	246.01	24.8-34.8	1/31/2018	28.46	28.10	217.55
	SHAW05-MW004	780489.45	2160336.72	245.64	24.8-34.8	1/31/2018	28.02	27.98	217.62
A EEE Area 6	SHAW06-MW001	776549.45	2154067.92	310.44	22.8-32.8	1/29/2018	30.14	27.17	280.30
AFFF Area 6 WWTP	SHAW06-MW002	776416.42	2154043.84	305.40	19.8-29.8	1/29/2018	25.14	25.36	280.26
** ** 11	SHAW06-MW003	776492.32	2153941.24	307.09	17.8-27.8	1/29/2018	26.94	24.00	280.15

**Table F-1 Groundwater Level Measurements** 

<sup>a</sup>Note: Northing and Easting coordinates are in South Carolina State Plane Coordinates based on the North American Datum of 1983 (NAD83) and measured in International Feet. Elevations are referenced to the North American Vertical Datum 1988 (NAVD88).

<sup>b</sup>Measuring point at top of well casing.

AFFF = aqueous film forming foam

btoc = below top of casing

FTA = fire training area

WWTP = Wastewater Treatment Plant

bgs = below ground surface EOD = explosive ordnance disposal SHAW = Shaw Air Force Base