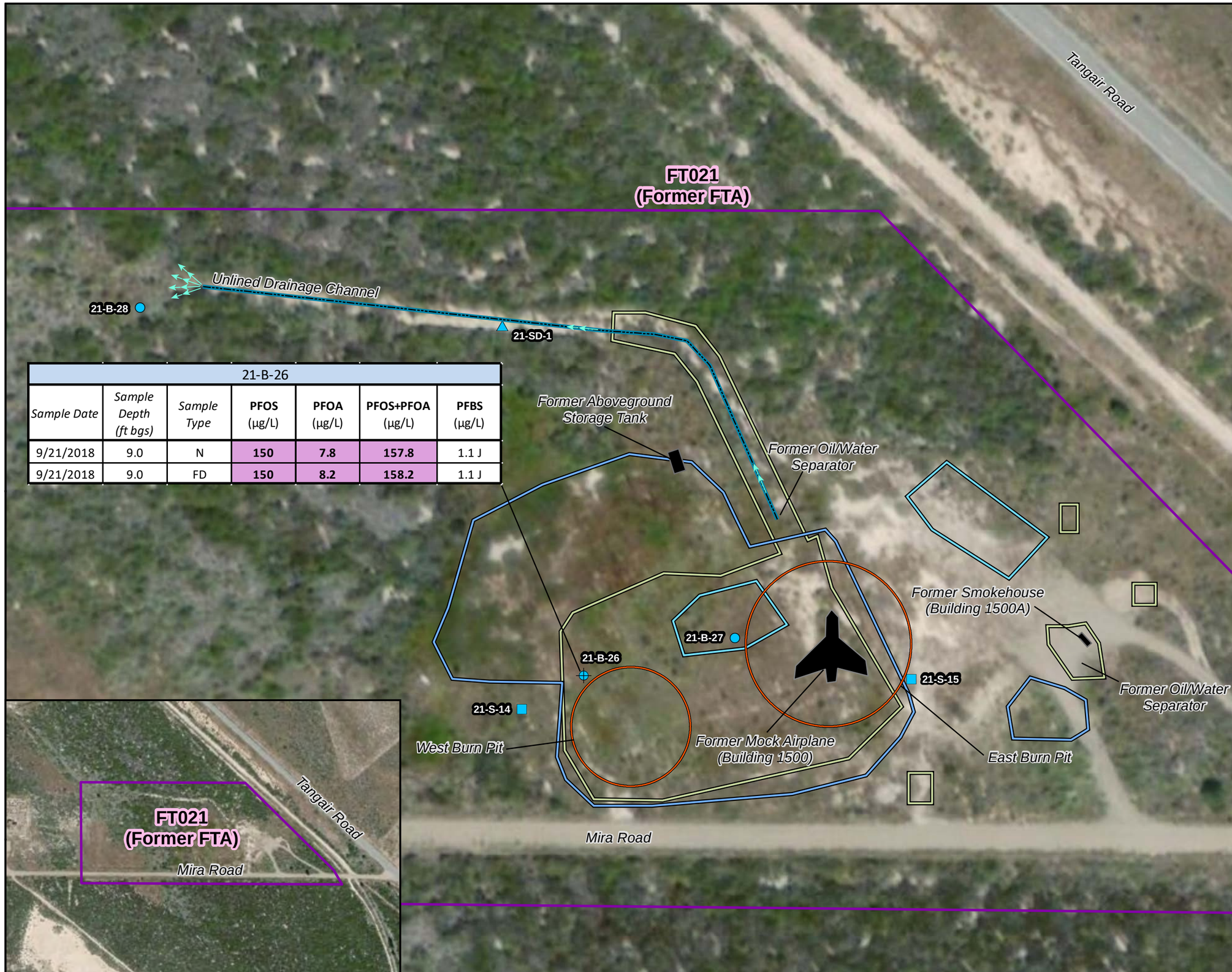

21-B-26						
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS (µg/L)**	**PFOA (µg/L)**	**PFOS+PFOA (µg/L)**	**PFBS (µg/L)**
9/21/2018	9.0	N	**150**	**7.8**	**157.8**	1.1 J
9/21/2018	9.0	FD	**150**	**8.2**	**158.2**	1.1 J

FIGURE 3.1-3
PFAS in Excavation Backfill Water
FT021 (Former FTA)
AFFF Release Area 1
Vandenberg Air Force Base
California

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Film Forming Foam (AFFF)
Release Areas
Environmental Programs Worldwide
Site Inspection Report

Air Force Civil Engineer Center

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Symbol Key

- Soil Boring/Temporary Monitoring Well
- Sediment Sample
- Soil Boring
- Surface Soil Sample
- Unlined Drainage Channel
- 01/2006 Excavation
- 12/2005 Excavation
- 10/2004 Excavation
- Former Burn Pit
- AFFF Release Area
- Surface Water Flow Direction

Notes

Water encountered is excavation backfill water. No groundwater is present.

Site features and excavation boundaries from Versar 2008

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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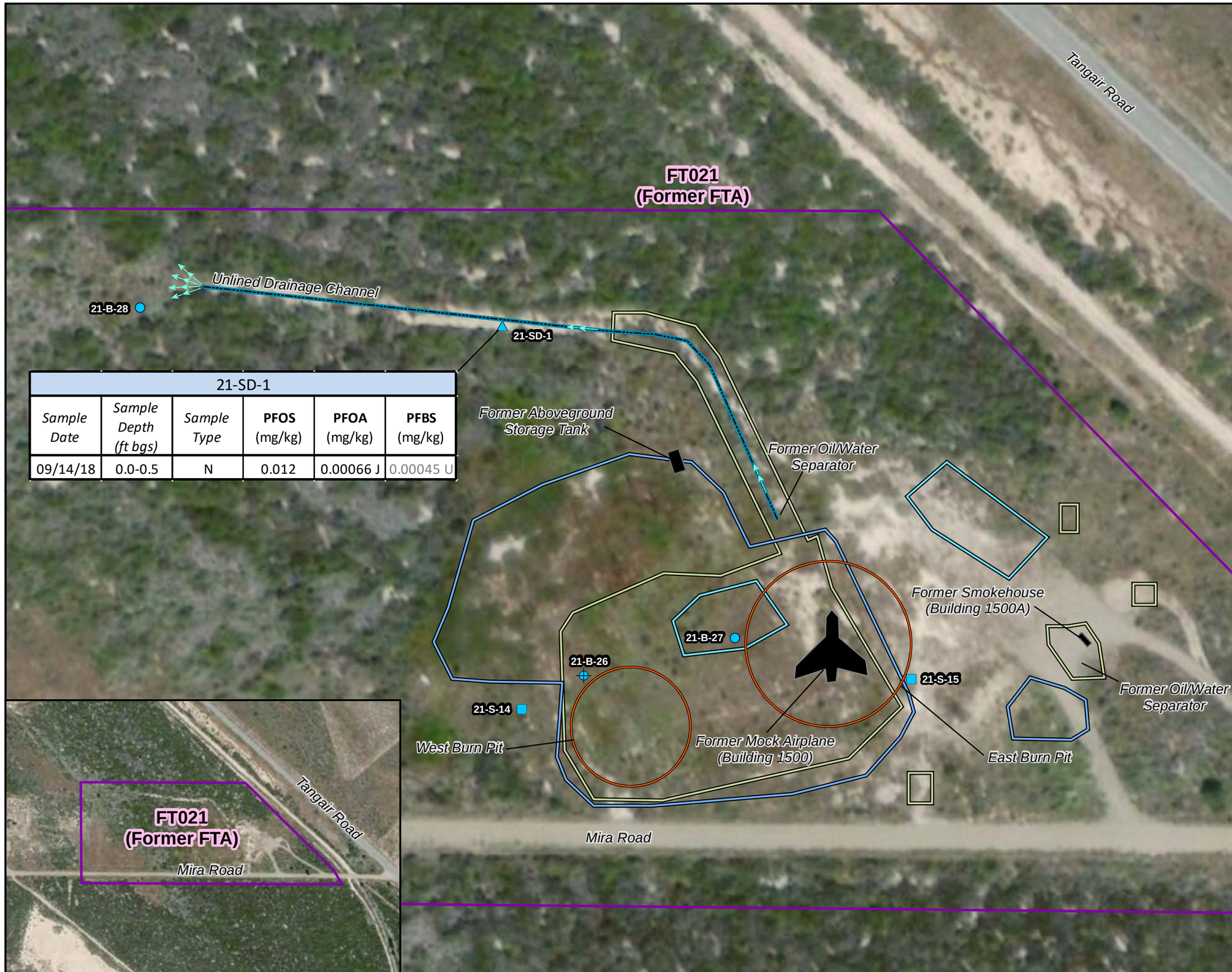

21-SD-1					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
09/14/18	0.0-0.5	N	0.012	0.00066 J	0.00045 U

FIGURE 3.1-4
PFAS in Sediment
FT021 (Former FTA)
AFFF Release Area 1
Vandenberg Air Force Base
California

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Environmental Programs Worldwide Site Inspection Report

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Symbol Key

- Soil Boring/Temporary Monitoring Well
- Sediment Sample
- Soil Boring
- Surface Soil Sample
- Unlined Drainage Channel
- 01/2006 Excavation
- 12/2005 Excavation
- 10/2004 Excavation
- Former Burn Pit
- AFFF Release Area
- Surface Water Flow Direction

Notes

Site features and excavation boundaries from Versar 2008

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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FIGURE 3.2-1
Sampling Locations and Groundwater Elevations (September 2018)
1992 Fuel Spill
AFFF Release Area 2
Vandenberg Air Force Base
California

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Symbol Key

Soil Boring/Temporary Monitoring Well

AFFF Release Area

488.22 Groundwater Elevation (ft amsl)

Notes

Due to limited groundwater elevation data and absence of historical data, groundwater flow direction could not be evaluated.

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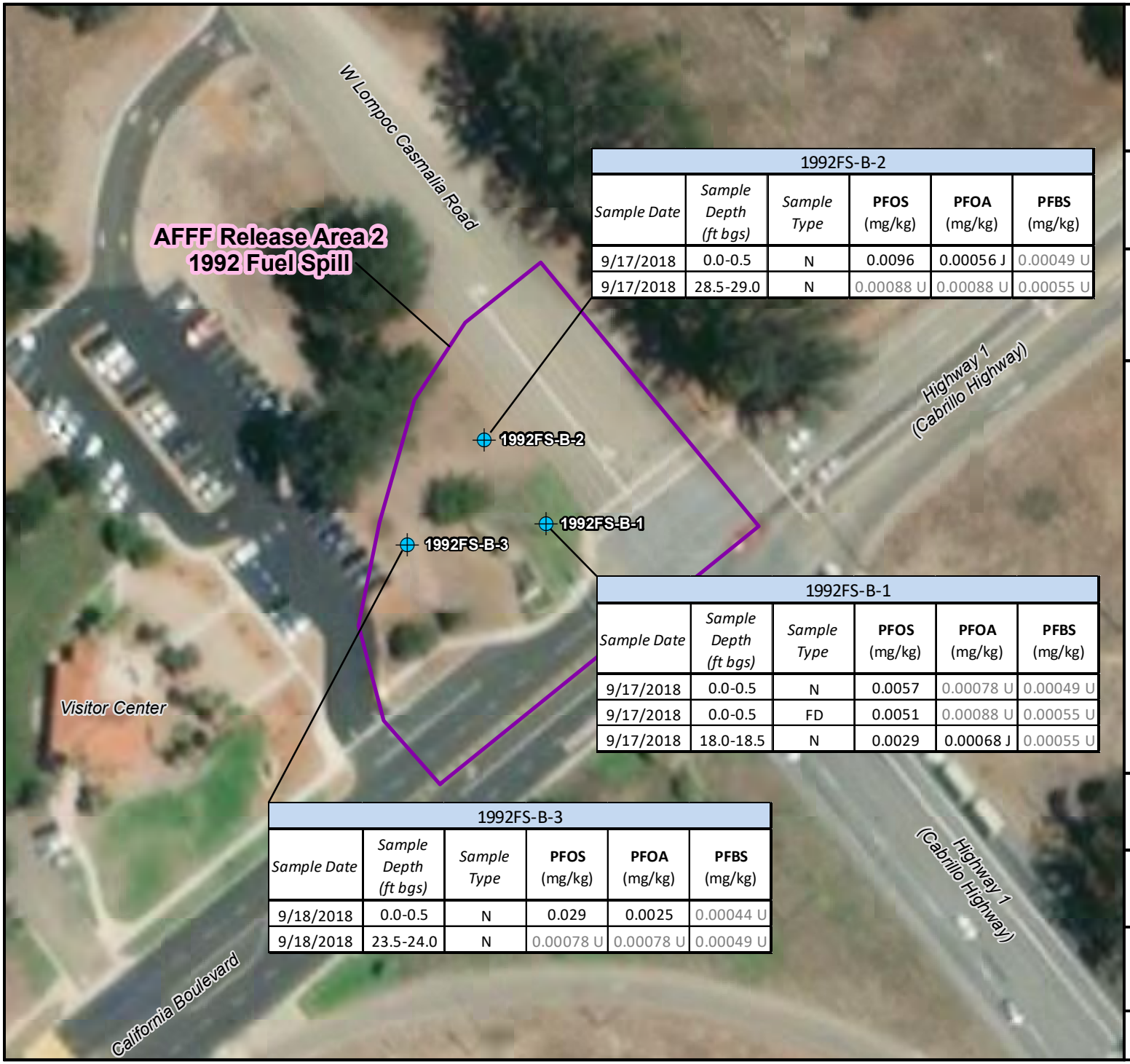
G:\GIS_Workspace\2016 Projects\2016186 - Vandenbeg\SI\Figure 3.2-1.mxd



1992FS-B-2					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/17/2018	0.0-0.5	N	0.0096	0.00056 J	0.00049 U
9/17/2018	28.5-29.0	N	0.00088 U	0.00088 U	0.00055 U

1992FS-B-1					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/17/2018	0.0-0.5	N	0.0057	0.00078 U	0.00049 U
9/17/2018	0.0-0.5	FD	0.0051	0.00088 U	0.00055 U
9/17/2018	18.0-18.5	N	0.0029	0.00068 J	0.00055 U

1992FS-B-3					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/18/2018	0.0-0.5	N	0.029	0.0025	0.00044 U
9/18/2018	23.5-24.0	N	0.00078 U	0.00078 U	0.00049 U

FIGURE 3.2-2
PFAS in Soil
1992 Fuel Spill
AFFF Release Area 2
Vandenberg Air Force Base
California

Site Inspection of Aqueous
Film Forming Foam (AFFF)
Release Areas
Environmental Programs Worldwide
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Symbol Key

Soil Boring/Temporary Monitoring Well

AFFF Release Area

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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0 50 100 Ft.

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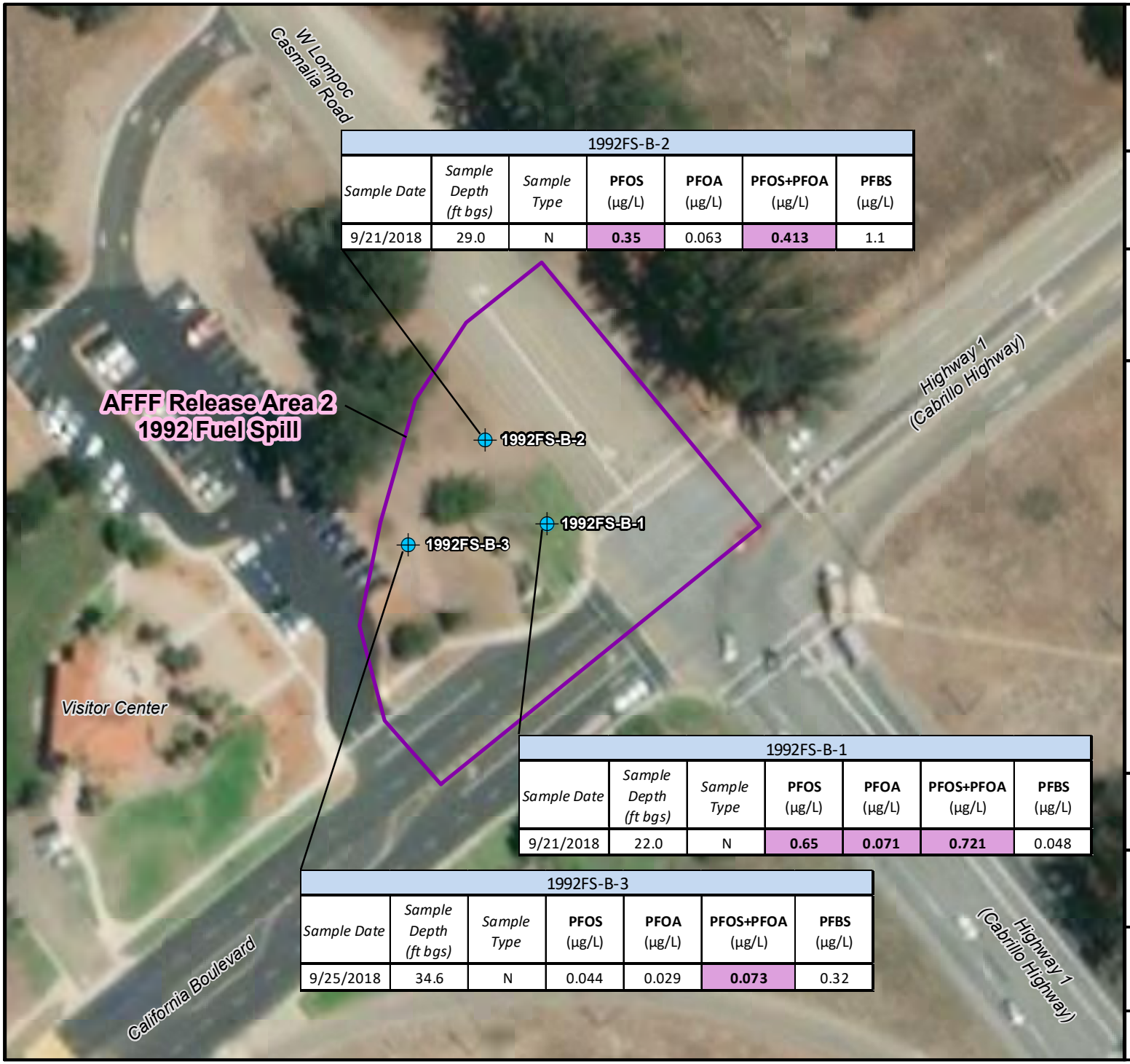

1992FS-B-2						
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS (µg/L)**	**PFOA (µg/L)**	**PFOS+PFOA (µg/L)**	**PFBS (µg/L)**
9/21/2018	29.0	N	**0.35**	0.063	**0.413**	1.1

1992FS-B-1						
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS (µg/L)**	**PFOA (µg/L)**	**PFOS+PFOA (µg/L)**	**PFBS (µg/L)**
9/21/2018	22.0	N	**0.65**	**0.071**	**0.721**	0.048

1992FS-B-3						
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS (µg/L)**	**PFOA (µg/L)**	**PFOS+PFOA (µg/L)**	**PFBS (µg/L)**
9/25/2018	34.6	N	0.044	0.029	**0.073**	0.32

FIGURE 3.2-3
PFAS in Groundwater
1992 Fuel Spill
AFFF Release Area 2
Vandenberg Air Force Base
California

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Film Forming Foam (AFFF)
Release Areas
Environmental Programs Worldwide
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Symbol Key

Soil Boring/Temporary Monitoring Well

AFFF Release Area

Notes

Due to limited groundwater elevation data and absence of historical data, groundwater flow direction could not be evaluated.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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0 50 100 Ft.

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FIGURE 3.3-1
Sampling Locations and Groundwater Elevations (September 2018)
2006 Fuel Spill
AFFF Release Area 3
Vandenberg Air Force Base
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Symbol Key

- Soil Boring/Temporary Monitoring Well
- Sediment Sample
- Underground Culvert
- AFFF Release Area
- 351.23 Groundwater Elevation (ft amsl)
- Surface Water Flow Direction

Notes

Due to limited groundwater elevation data and absence of historical data, groundwater flow direction could not be evaluated.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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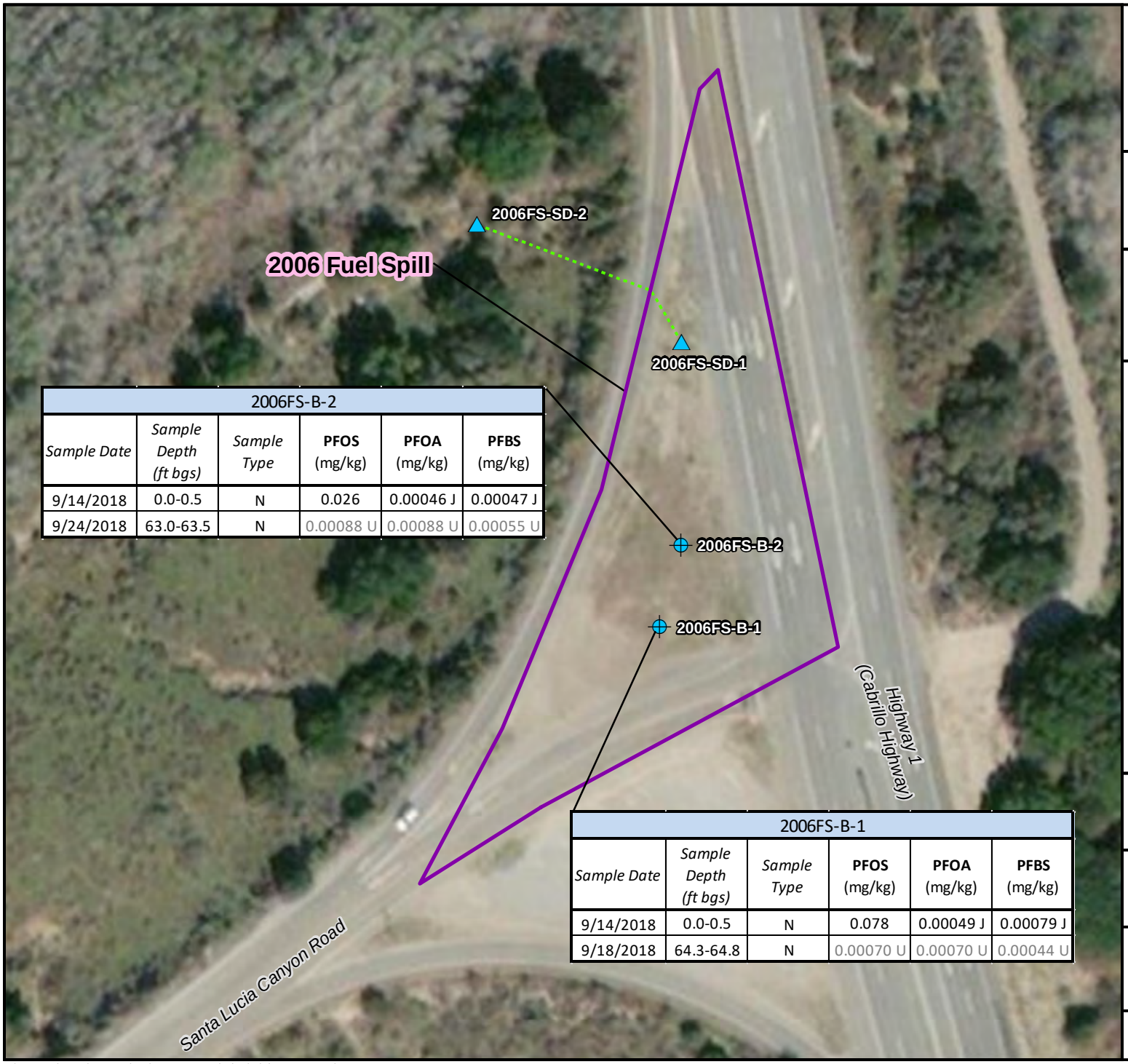

2006FS-B-2					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/14/2018	0.0-0.5	N	0.026	0.00046 J	0.00047 J
9/24/2018	63.0-63.5	N	0.00088 U	0.00088 U	0.00055 U

2006FS-B-1					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/14/2018	0.0-0.5	N	0.078	0.00049 J	0.00079 J
9/18/2018	64.3-64.8	N	0.00070 U	0.00070 U	0.00044 U

FIGURE 3.3-2
PFAS in Soil
2006 Fuel Spill
AFFF Release Area 3
Vandenberg Air Force Base
California

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Film Forming Foam (AFFF)
Release Areas
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Symbol Key

- Soil Boring/Temporary Monitoring Well
- Sediment Sample
- Underground Culvert
- AFFF Release Area

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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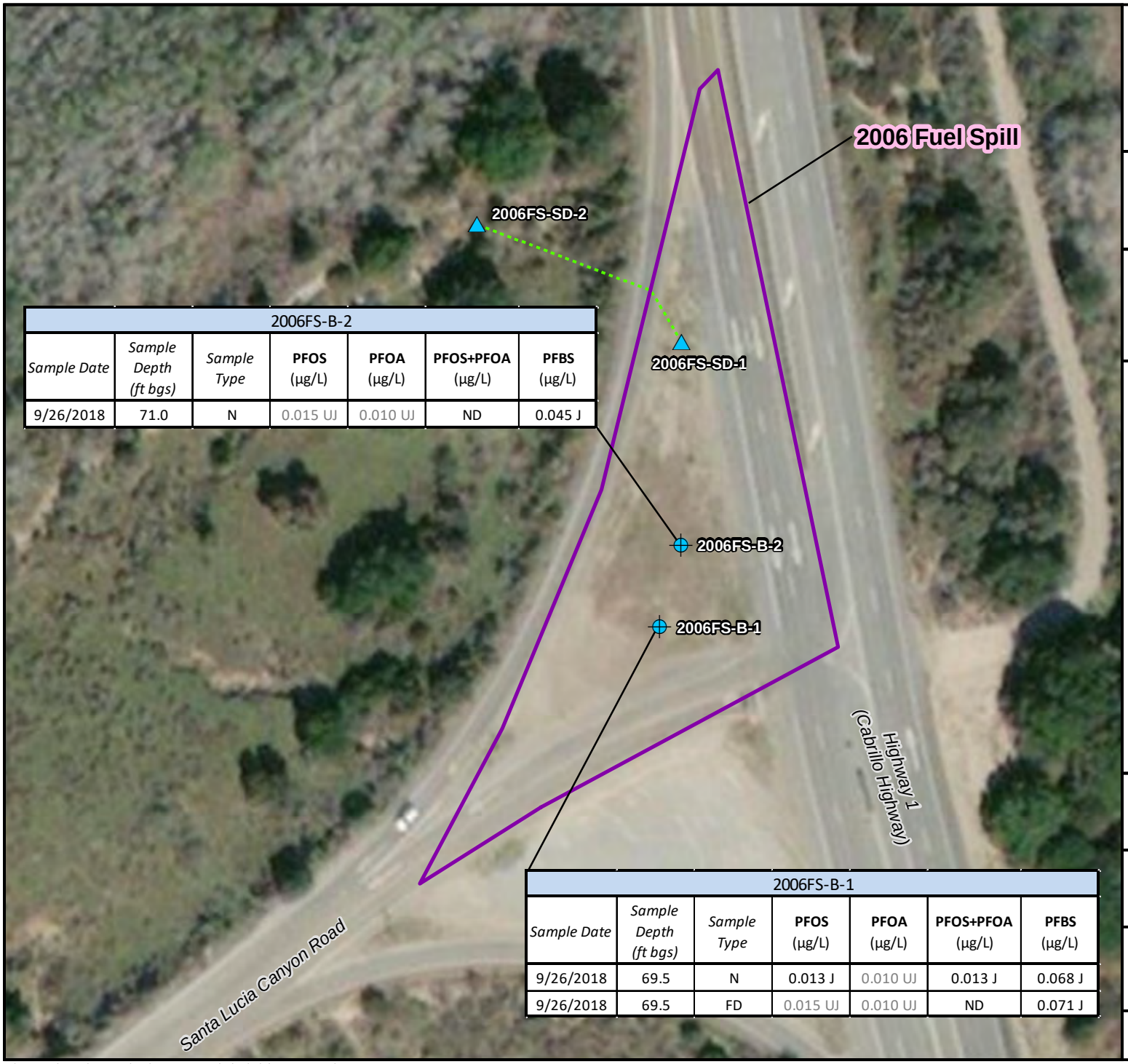

2006FS-B-2						
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (µg/L)	**PFOA** (µg/L)	**PFOS+PFOA** (µg/L)	**PFBS** (µg/L)
9/26/2018	71.0	N	0.015 UJ	0.010 UJ	ND	0.045 J

2006FS-B-1						
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (µg/L)	**PFOA** (µg/L)	**PFOS+PFOA** (µg/L)	**PFBS** (µg/L)
9/26/2018	69.5	N	0.013 J	0.010 UJ	0.013 J	0.068 J
9/26/2018	69.5	FD	0.015 UJ	0.010 UJ	ND	0.071 J

FIGURE 3.3-3
PFAS in Groundwater
2006 Fuel Spill
AFFF Release Area 3
Vandenberg Air Force Base
California

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Film Forming Foam (AFFF)
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Environmental Programs Worldwide
Site Inspection Report

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Symbol Key

- Soil Boring/Temporary Monitoring Well
- Sediment Sample
- Underground Culvert
- AFFF Release Area

Notes

Due to limited groundwater elevation data and absence of historical data, groundwater flow direction could not be evaluated.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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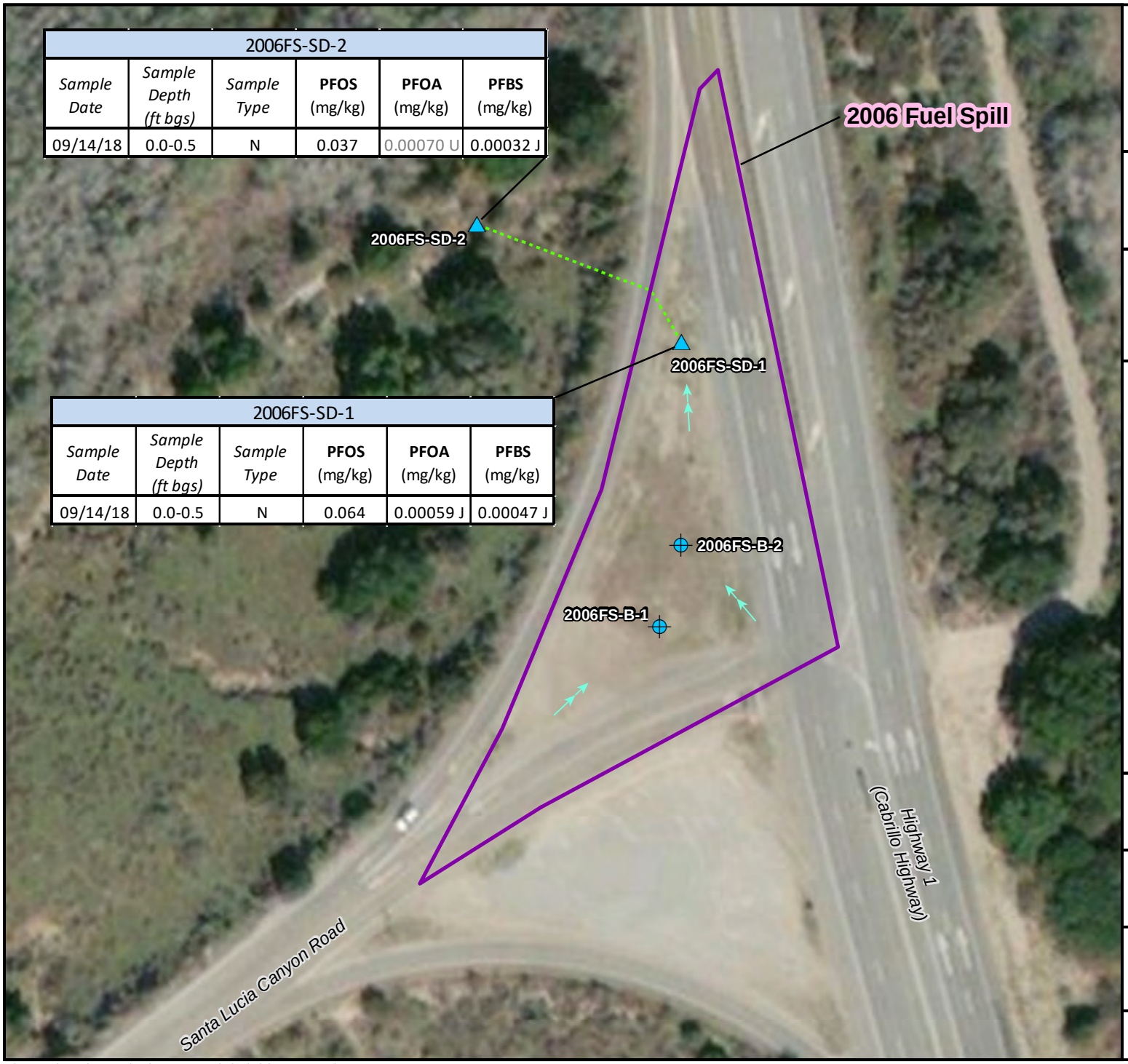

2006FS-SD-2					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
09/14/18	0.0-0.5	N	0.037	0.00070 U	0.00032 J

2006FS-SD-1					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
09/14/18	0.0-0.5	N	0.064	0.00059 J	0.00047 J

FIGURE 3.3-4
PFAS in Sediment
2006 Fuel Spill
AFFF Release Area 3
Vandenberg Air Force Base
California

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Symbol Key

- Soil Boring/Temporary Monitoring Well
- Sediment Sample
- Underground Culvert
- AFFF Release Area
- Surface Water Flow Direction

Notes

Due to limited groundwater elevation data and absence of historical data, groundwater flow direction could not be evaluated.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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FIGURE 3.4-1
Sampling Locations
2009 AFFF Release
AFFF Release Area 4
Vandenberg Air Force Base
California

Site Inspection of Aqueous
Film Forming Foam (AFFF)
Release Areas
Environmental Programs Worldwide
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Symbol Key

Soil Boring

AFFF Release Area

1746 Building Number

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0 100 200 Ft.

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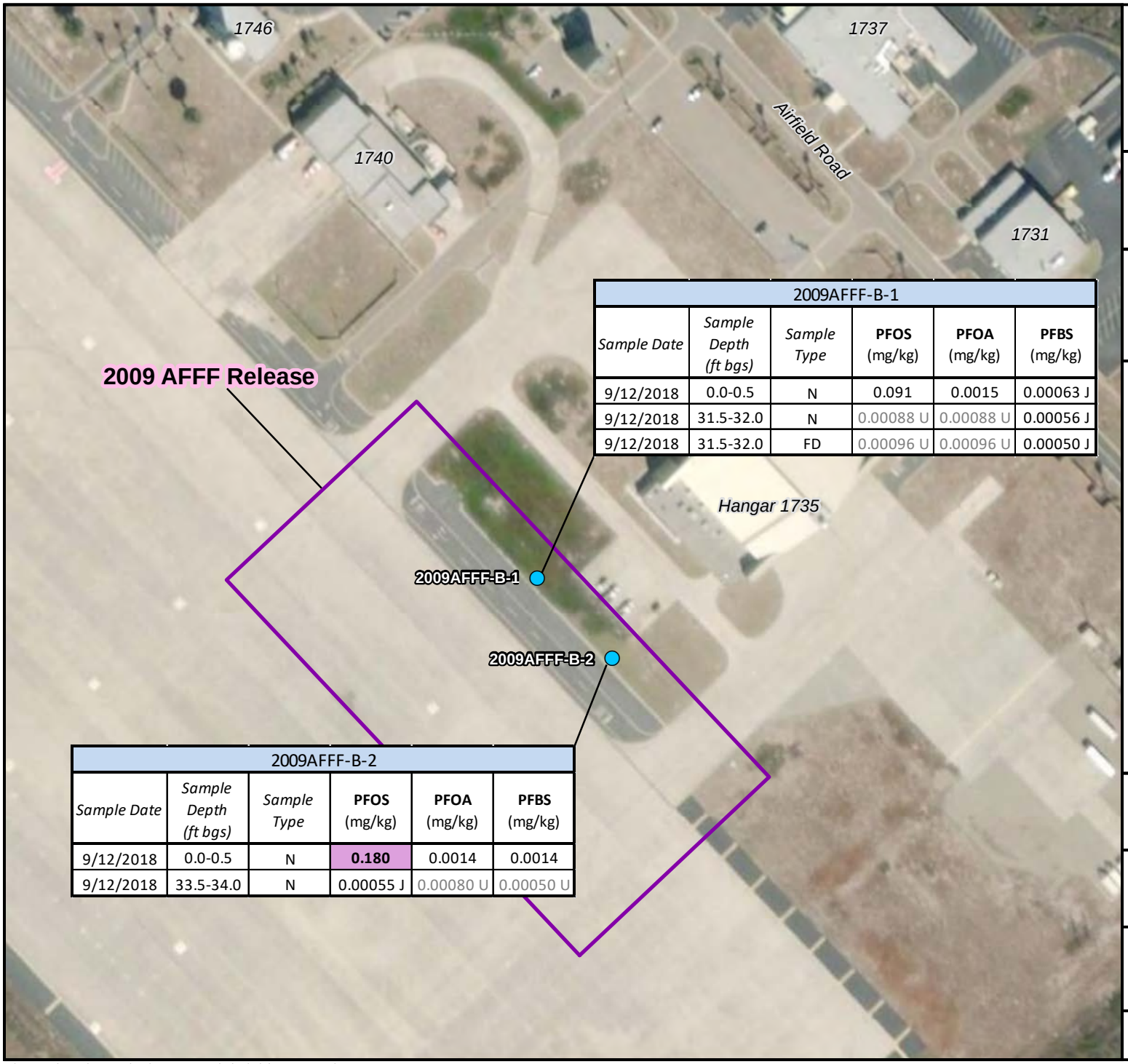

2009AFFF-B-1					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/12/2018	0.0-0.5	N	0.091	0.0015	0.00063 J
9/12/2018	31.5-32.0	N	0.00088 U	0.00088 U	0.00056 J
9/12/2018	31.5-32.0	FD	0.00096 U	0.00096 U	0.00050 J

2009AFFF-B-2					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/12/2018	0.0-0.5	N	**0.180**	0.0014	0.0014
9/12/2018	33.5-34.0	N	0.00055 J	0.00080 U	0.00050 U

FIGURE 3.4-2
PFAS in Soil
2009 AFFF Release
AFFF Release Area 4
Vandenberg Air Force Base
California

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Symbol Key

Soil Boring

AFFF Release Area

1746 Building Number

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0 100 200 Ft.

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FIGURE 3.5-1
Sampling Locations
Spray Nozzle Test Area
AFFF Release Area 5
Vandenberg Air Force Base, California

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Film Forming Foam (AFFF)
Release Areas
Environmental Programs Worldwide
Site Inspection Report

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Symbol Key

- Soil Boring
- Sediment Sample
- AFFF Release Area
- Unlined Drainage Channel
- Surface Water Flow Direction

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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0 50 100 Ft.

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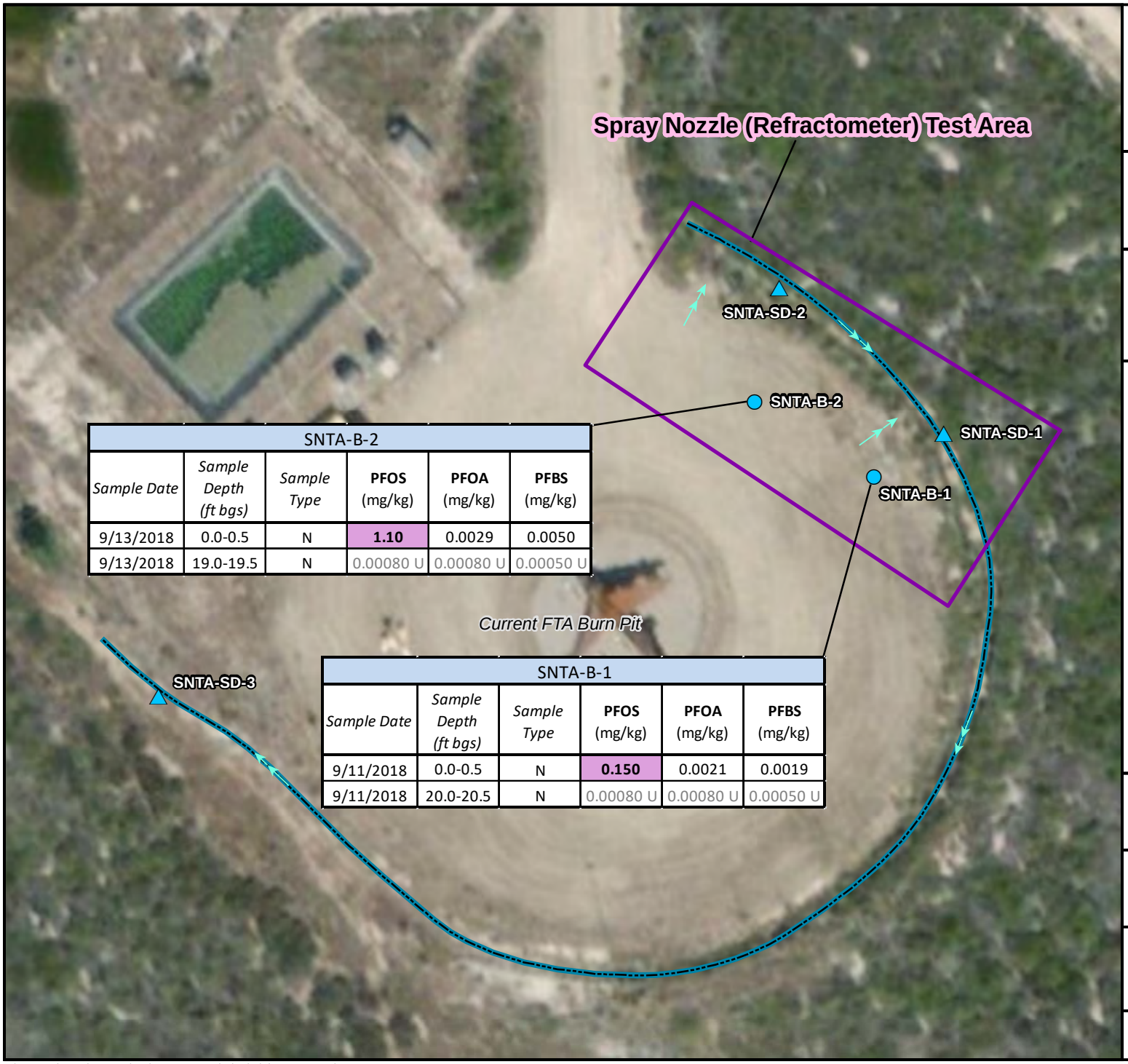

SNTA-B-2					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/13/2018	0.0-0.5	N	**1.10**	0.0029	0.0050
9/13/2018	19.0-19.5	N	0.00080 U	0.00080 U	0.00050 U

SNTA-B-1					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
9/11/2018	0.0-0.5	N	**0.150**	0.0021	0.0019
9/11/2018	20.0-20.5	N	0.00080 U	0.00080 U	0.00050 U

FIGURE 3.5-2
PFAS in Soil
Spray Nozzle Test Area
AFFF Release Area 5
Vandenberg Air Force Base, California

Site Inspection of Aqueous
Film Forming Foam (AFFF)
Release Areas
Environmental Programs Worldwide
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Symbol Key

- Soil Boring
- Sediment Sample
- AFFF Release Area
- Unlined Drainage Channel
- Surface Water Flow Direction

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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0 50 100 Ft.

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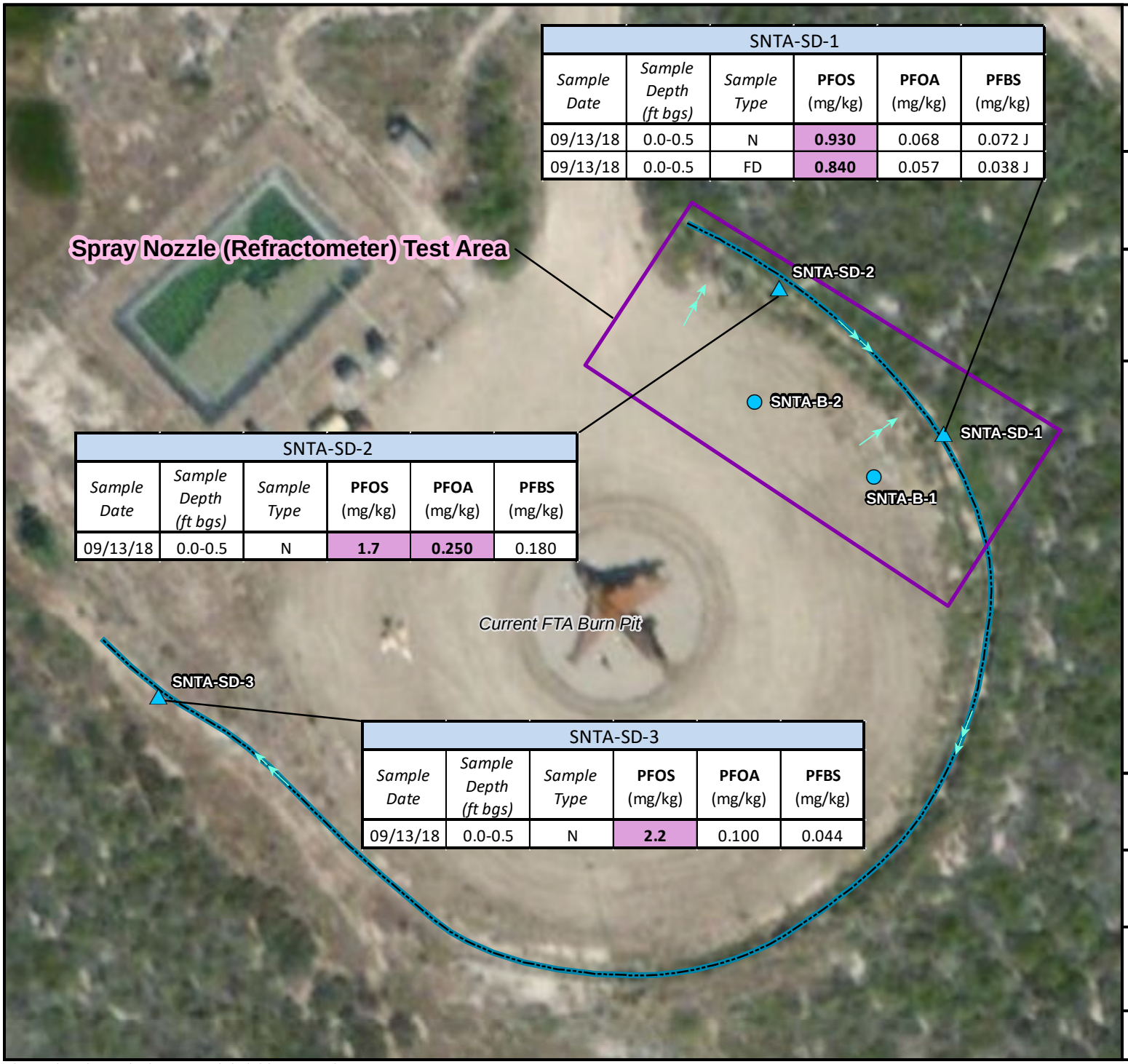

SNTA-SD-1					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
09/13/18	0.0-0.5	N	**0.930**	0.068	0.072 J
09/13/18	0.0-0.5	FD	**0.840**	0.057	0.038 J

SNTA-SD-2					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
09/13/18	0.0-0.5	N	**1.7**	**0.250**	0.180

SNTA-SD-3					
Sample Date	*Sample Depth (ft bgs)*	*Sample Type*	**PFOS** (mg/kg)	**PFOA** (mg/kg)	**PFBS** (mg/kg)
09/13/18	0.0-0.5	N	**2.2**	0.100	0.044

FIGURE 3.5-3
PFAS in Sediment
Spray Nozzle Test Area
AFFF Release Area 5
Vandenberg Air Force Base, California

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Environmental Programs Worldwide
Site Inspection Report

Air Force Civil Engineer Center

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Symbol Key

- Soil Boring
- Sediment Sample
- AFFF Release Area
- Unlined Drainage Channel
- Surface Water Flow Direction

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

Disclaimer: For general reference purposes only. DO NOT USE to determine, certify, or verify map features, scale and/or other information.

N W E S

Contract: FA8903-16-D-0027

By: MLW | **1/14/2019**

0 50 100 Ft.

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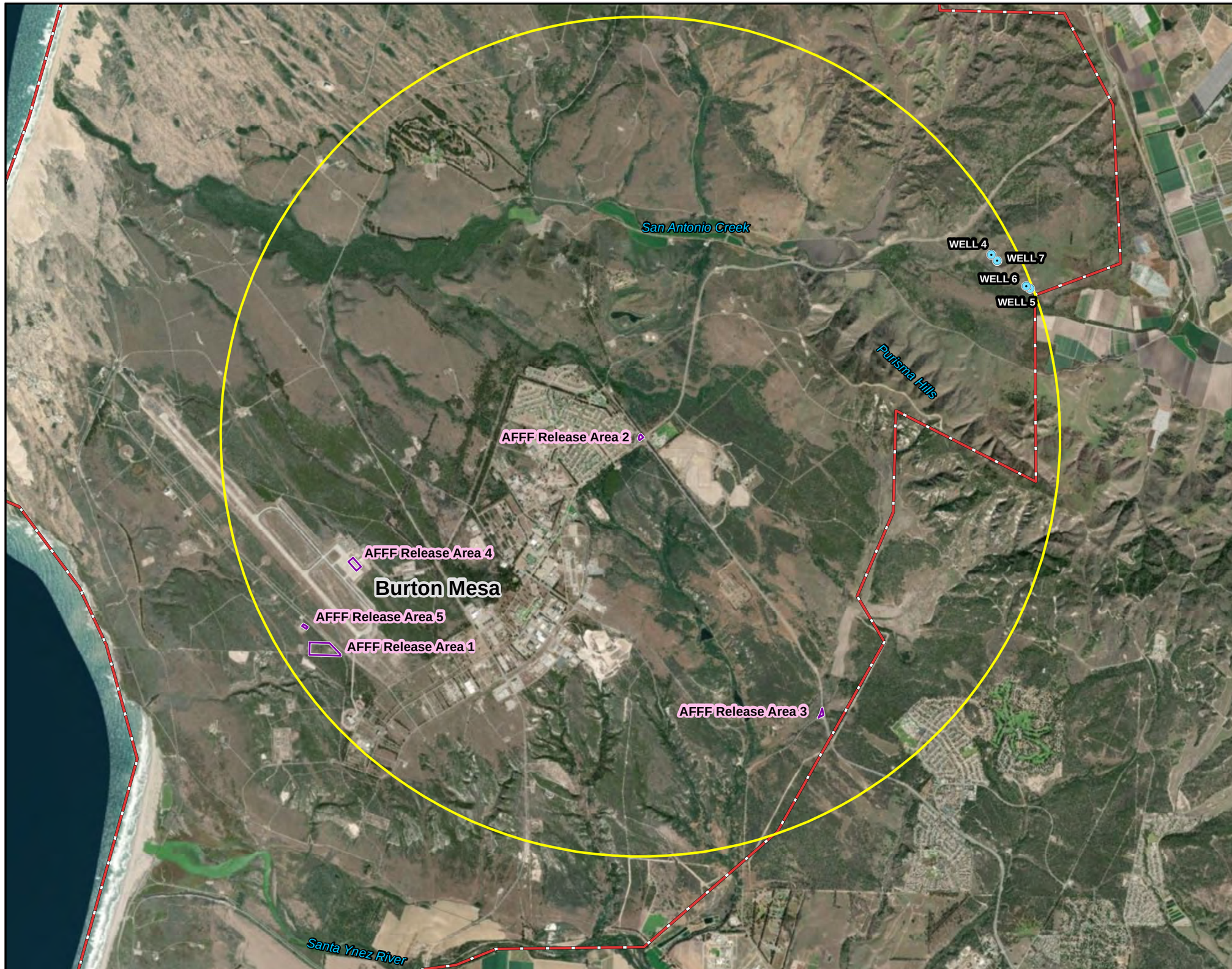

FIGURE 4.1-1
Desktop Four-Mile Water Well Review Results
Vandenberg Air Force Base
California

Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas
Environmental Programs Worldwide
Site Inspection Report

Air Force Civil Engineer Center

2261 Hughes Avenue
Building 1, Suite 155
JBSA Lackland, Texas 78236

Symbol Key

- Base Water Supply Well
- Installation Boundary
- AFFF Release Area

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2016)

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N W E S

Contract: FA8903-16-D-0027

By: MLW | **1/14/2019**

0 2,300 4,600 Ft.

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TABLES

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Table 3.0-1
Monitoring Well Construction Details
Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas
Site Inspection Report, Vandenberg Air Force Base, Santa Barbara County, California

AFFF Release Area	Area Description	Location ID	Installation Date	Well Destruction Date	Well Material	Northing[1]	Easting[1]	Ground Surface Elevation[2] (ft amsl)	TOC Elevation[2] (ft amsl)	Well Depth (ft bgs)	Well Diameter (in)	Screen Length (ft)	Screen Size (in)	Screen Interval (ft bgs)
1	FT021 (Former FTA)	21-B-26	9/10/2018	9/27/2018	Schedule 40 PVC	2094369.02	5788550.01	352.53	354.64	14.0	2.0	10.0	0.010	3.4 - 13.4
2	1992 Fuel Spill	1992FS-B-1	9/17/2018	9/27/2018	Schedule 40 PVC	2105172.43	5804510.86	517.84	518.00	26.0	2.0	10.0	0.010	16.0 - 26.0
		1992FS-B-2	9/17/2018	9/27/2018	Schedule 40 PVC	2105212.02	5804476.71	514.48	515.13	35.0	2.0	10.0	0.010	24.6 - 34.6
		1992FS-B-3	9/18/2018	9/27/2018	Schedule 40 PVC	2105175.12	5804441.66	512.57	514.36	33.5	2.0	10.0	0.010	23.3 - 33.3
3	2006 Fuel Spill	2006FS-B-1	9/19/2018	9/28/2018	Schedule 40 PVC	2091194.54	5813596.01	229.90	230.06	73.0	2.0	10.0	0.010	63.2 - 73.2
		2006FS-B-2	9/24/2018	9/28/2018	Schedule 40 PVC	2091242.27	5813609.52	227.27	227.54	74.0	2.0	10.0	0.010	63.6 - 73.6

Notes:

[1]Horizontal datum is North American Datum of 1983 (NAD83)

[2]Vertical datum is North American Vertical Datum of 1988 (NAVD88)

AFFF - aqueous film forming foam
amsl - above mean sea level
bgs - below ground surface
ft - feet
ID - identification
in - inches
PVC - Polyvinyl Chloride
TOC - top of casing

Table 3.0-2
Groundwater Elevations
Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas
Site Inspection Report, Vandenberg Air Force Base, Santa Barbara County, California

AFFF Release Area	Area Description	Location ID	Well Depth (ft bgs)	Ground Surface Elevation[1] (ft amsl)	TOC Elevation[1] (ft amsl)	Date Measured	Depth to Groundwater (ft btoc)[2]	Groundwater Elevation (ft amsl)
1	FT021 (Former FTA)	21-B-26	14.0	352.53	354.64	9/21/2018	3.41	351.23
2	1992 Fuel Spill	1992FS-B-1	26.0	517.84	518.00	9/21/2018	17.15	500.85
		1992FS-B-2	35.0	514.48	515.13	9/21/2018	26.91	488.22
		1992FS-B-3	33.5	512.57	514.36	9/25/2018	26.14	488.22
3	2006 Fuel Spill	2006FS-B-1	73.0	229.90	230.06	9/26/2018	66.40	163.66
		2006FS-B-2	74.0	227.27	227.54	9/26/2018	64.65	162.89

Notes:
[1]Vertical datum is North American Vertical Datum of 1988 (NAVD88)
[2]Depth to water in 21-B-26 was depth to water ponded in the excavation backfill. No groundwater is present at FT021.
AFFF - aqueous film forming foam
amsl - above mean sea level
bgs - below ground surface
btoc - below top of casing
ft - feet
ID - identification
TOC - top of casing

Table 3.1-1
Summary of Soil Analytical Results
Site Inspection of Aqueous Film Forming Foam (AFFF) Areas
Site Inspection Report, Vandenberg Air Force Base, Santa Barbara County, California

						Analyte	Perfluorooctanesulfonic Acid (PFOS)	Perfluorooctanoic Acid (PFOA)	Perfluorobutanesulfonic Acid (PFBS)	6:2 Fluorotelomer sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonate (8:2 FTS)	N-Ethyl perfluorooctanesulfonamido acetic acid (NEtFOSAA)	N-Methyl perfluorooctanesulfonamido acetic acid (NMeFOSAA)	Perfluorodecanoic Acid (PFDA)	Perfluorododecanoic Acid (PFDoA)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexane Sulfonate (PFHxS)	Perfluorohexanoic Acid (PFHxA)	Perfluorononanoic Acid (PFNA)	Perfluorotetradecanoic Acid (PFTeDA)	Perfluorotridecanoic Acid (PFTrDA)	Perfluoroundecanoic Acid (PFUnA)
						Screening Level:	**0.126[1]**	**0.126[1]**	**130[2]**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**
AFFF Release Area	**Area Description**	**Location ID**	**Sample ID**	**Sample Date**	**Sample Depth (ft bgs)**	**Sample Type**	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1	FT021 (Former FTA)	21-S-14	21-S14-0.5	9/14/2018	0.0-0.5	N	0.017	0.0037	0.0010	0.00070 U	0.00070 U	0.00044 U	0.00070 U	0.00070 U	0.00074 U	0.00043 J	0.0066	0.0037 J	0.00038 J	0.00070 U	0.00070 U	0.00070 U
			DUP1-FT021-0.5	9/14/2018	0.0-0.5	FD	0.016	0.0038	0.00091	0.00064 U	0.00064 U	0.00040 U	0.00064 U	0.00064 U	0.00061 U	0.00040 J	0.0070	0.0027 J	0.00041 J	0.00064 U	0.00064 U	0.00064 U
		21-S-15	21-S15-0.5	9/14/2018	0.0-0.5	N	0.110	0.0059	0.00084 J	0.0035	0.0069	0.00045 U	0.00072 U	0.00082 J	0.00072 U	0.00094	0.022	0.0031	0.0012	0.00072 U	0.00061 J	0.0013
		21-B-26	21-B26-4.0	9/10/2018	4.2-4.7	N	**0.190**	0.0065	0.00051 J	0.0036	0.023	0.00065 U	0.0010 U	0.0010 U	0.00096 U	0.0013	0.016	0.0046	0.0017	0.00096 U	0.00096 U	0.0010 U
		21-B-27	21-B27-8.5	9/10/2018	8.5-9.0	N	0.056	0.0029	0.00030 J	0.0023	0.028	0.00075 U	0.0012 U	0.00054 J	0.0011 U	0.00086 J	0.0085	0.0023	0.00067 J	0.0012 U	0.0012 U	0.0012 U
		21-B-28	21-B28-0.5	9/13/2018	0.0-0.5	N	**0.550**	0.014	0.0028 J	0.120	0.440	0.0045 J	0.0054 J	0.0088	0.0054 J	0.0066 J	0.045	0.031	0.0047 J	0.0070 U	0.0086 J	0.034
			21-B28-19	9/13/2018	19.4-19.9	N	0.0011 U	0.0011 U	0.00041 J	0.0011 U	0.0011 U	0.00070 U	0.0011 U	0.0011 U	0.0012 U	0.00070 U	0.00070 U	0.0014	0.00070 U	0.0012 U	0.0012 U	0.0011 U
2	1992 Fuel Spill	1992FS-B-1	1992FS-B1-0.5	9/17/2018	0.0-0.5	N	0.0057	0.00078 U	0.00049 U	0.00078 U	0.00078 U	0.00049 U	0.00078 U	0.00078 U	0.00078 U	0.00049 U	0.00058 J	0.00049 U	0.00049 U	0.00078 U	0.00078 U	0.00078 U
			DUP2-1992FS-0.5	9/17/2018	0.0-0.5	FD	0.0051	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00088 U	0.00055 U	0.00057 J	0.00055 U	0.00055 U	0.00088 U	0.00088 U	0.00088 U
			1992FS-B1-18	9/17/2018	18.0-18.5	N	0.0029	0.00068 J	0.00055 U	0.00088 U	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00088 U	0.00055 U	0.0020	0.00066 J	0.00055 U	0.00088 U	0.00088 U	0.00088 U
		1992FS-B-2	1992FS-B2-0.5	9/17/2018	0.0-0.5	N	0.0096	0.00056 J	0.00049 U	0.00078 U	0.00078 U	0.00049 U	0.00078 U	0.00078 U	0.00078 U	0.00049 U	0.00054 J	0.00049 U	0.00049 U	0.00078 U	0.00078 U	0.00078 U
			1992FS-B2-28.5	9/17/2018	28.5-29.0	N	0.00088 U	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00088 U	0.00055 U	0.0013	0.00055 U	0.00055 U	0.00088 U	0.00088 U	0.00088 U
		1992FS-B-3	1992FS-B3-0.5	9/18/2018	0.0-0.5	N	0.029	0.0025	0.00044 U	0.00070 U	0.00070 U	0.00045 UJ	0.00071 UJ	0.00070 U	0.00071 UJ	0.00044 U	0.0029	0.00055 J	0.00053 J	0.00071 U	0.00071 U	0.00071 UJ
			1992FS-B3-23.5	9/18/2018	23.5-24.0	N	0.00078 U	0.00078 U	0.00049 U	0.00078 U	0.00078 U	0.00049 U	0.00078 U	0.00078 U	0.00078 U	0.00049 U	0.00056 J	0.00049 U	0.00049 U	0.00078 U	0.00078 U	0.00078 U
3	2006 Fuel Spill	2006FS-B-1	2006FS-B1-0.5	9/14/2018	0.0-0.5	N	0.078	0.00049 J	0.00079 J	0.00070 U	0.00070 U	0.00044 U	0.00070 U	0.00070 U	0.00077 U	0.00044 U	0.025	0.00046 J	0.00044 U	0.00070 U	0.00070 U	0.00070 U
			2006FS-B1-64.3	9/18/2018	64.3-64.8	N	0.00070 U	0.00070 U	0.00044 U	0.00070 U	0.00070 U	0.00044 U	0.00070 U	0.00070 U	0.00070 U	0.00044 U	0.00044 U	0.00044 U	0.00044 U	0.00070 U	0.00070 U	0.00070 U
		2006FS-B-2	2006FS-B2-0.5	9/14/2018	0.0-0.5	N	0.026	0.00046 J	0.00047 J	0.00062 U	0.00062 U	0.00039 U	0.00062 U	0.00062 U	0.00066 U	0.00039 U	0.0064	0.00033 J	0.00039 U	0.00062 U	0.00062 U	0.00062 U
			2006FS-B2-63	9/24/2018	63.0-63.5	N	0.00088 U	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00088 U	0.00055 U	0.00055 U	0.00055 U	0.00055 U	0.00088 U	0.00088 U	0.00088 U
4	2009 AFFF Release	2009AFFF-B-1	2009AFFF-B1-0.5	9/12/2018	0.0-0.5	N	0.091	0.0015	0.00063 J	0.00054 J	0.00096 U	0.00060 U	0.00096 U	0.00096 U	0.0010 U	0.00039 J	0.0069	0.0011 J	0.00094 J	0.0010 U	0.0010 U	0.00096 U
			2009AFFF-B1-31.5	9/12/2018	31.5-32.0	N	0.00088 U	0.00088 U	0.00056 J	0.00088 U	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00096 U	0.00034 J	0.00026 J	0.0024	0.00055 U	0.00088 U	0.00088 U	0.00088 U
			DUP3-2009AFFF-31.5	9/12/2018	31.5-32.0	FD	0.00096 U	0.00096 U	0.00050 J	0.00096 U	0.00096 U	0.00060 U	0.00096 U	0.00096 U	0.00088 U	0.00036 J	0.00030 J	0.0020	0.00060 U	0.00096 U	0.00096 U	0.00096 U
		2009AFFF-B-2	2009AFFF-B2-0.5	9/12/2018	0.0-0.5	N	**0.180**	0.0014	0.0014	0.00083 J	0.00078 U	0.00049 U	0.00078 U	0.00078 U	0.00071 U	0.00058 J	0.015	0.0014	0.0012	0.00078 U	0.00078 U	0.00078 U
			2009AFFF-B2-33.5	9/12/2018	33.5-34.0	N	0.00055 J	0.00080 U	0.00050 U	0.00080 U	0.00080 U	0.00050 U	0.00080 U	0.0008 U	0.00096 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00080 U	0.00080 U	0.00080 U
5	Spray Nozzle (Refractometer) Test Area	SNTA-B-1	STNA-SB1-0.5	9/11/2018	0.0-0.5	N	**0.150**	0.0021	0.0019	0.0027	0.0062	0.00077 J	0.00071 J	0.00069 J	0.00033 J	0.00063 J	0.0082	0.0075	0.00060 J	0.00073 U	0.00073 U	0.00036 J
			STNA-SB1-20	9/11/2018	20.0-20.5	N	0.00080 U	0.00080 U	0.00050 U	0.00080 U	0.00080 U	0.00050 U	0.00080 U	0.00080 U	0.00080 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00080 U	0.00080 U	0.00080 U
		SNTA-B-2	STNA-SB2-0.5	9/13/2018	0.0-0.5	N	**1.10**	0.0029	0.0050	0.010	0.023	0.00046 U	0.00073 U	0.00060 J	0.00073 U	0.00088 J	0.016	0.011	0.0011	0.00073 U	0.00073 U	0.00073 U
			STNA-SB2-19	9/13/2018	19.0-19.5	N	0.00080 U	0.00080 U	0.0005 U	0.00080 U	0.00080 U	0.00050 U	0.00080 U	0.00080 U	0.00080 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00080 U	0.00080 U	0.00080 U

Notes:

Highlighted cells indicate concentrations exceeding USEPA screening values.

[1]Screening levels, based on residential scenario, were calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search] and a THQ of 0.1

[2]USEPA Regional Screening Levels (November, 2018) [https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables] based on a THQ of 0.1.

J - The reported result is an estimated value.

U - The analyte was not detected above the LOD. Reported as not detected in text.

UJ - Not detected. The analyte was not detected above the reported LOD. The numerical value of the LOD is estimated.

AFFF - Aqueous Film Forming Foam

bgs - below ground surface

FD - field duplicate sample

ft - feet

FTA- Fire Training Area

ID - identification

LOD - limit of detection

mg/kg - milligrams per kilogram

N - normal field sample

NL - no limit

USEPA - United States Environmental Protection Agency

Table 3.1-2
Summary of Soil General Chemistry Analytical Testing Results
Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas
Site Inspection Report, Vandenberg Air Force Base, Santa Barbara County, California

						Analyte:	pH	TOC
AFFF Release Area	**Area Description**	**Location ID**	**Sample ID**	**Sample Date**	**Sample Depth (ft bgs)**	**Sample Type**	S.U.	mg/kg
1	FT021 (Former FTA)	FT021	FT021-Comp-0.5	9/13/2018	0.0-0.5	composite	6.56	10,700
			FT021-Comp-20	9/13/2018	3.5-19.5	composite	5.79	256 J
2	1992 Fuel Spill	1992FS	1992FS-Comp-0.5	9/18/2018	0.0-0.5	composite	7.07	25,300
			1992FS-Comp-21	9/18/2018	17.5-29.0	composite	7.54	242 J
3	2006 Fuel Spill	2006FS	2006FS-Comp-0.5	9/14/2018	0.0-0.5	composite	7.47	81,000
			2006FS-Comp-63	9/24/2018	62.5-65.0	composite	7.41	618
4	2009 AFFF Release	2009AFFF	2009AFFF-Comp-0.5	9/12/2018	0.0-0.5	composite	5.80	18,400
			2009AFFF-Comp-32	9/12/2018	30.5-34.0	composite	5.23	807
5	Spray Nozzle (Refractometer) Test Area	SNTA	SNTA-Comp-0.5	9/13/2018	0.0-0.5	composite	8.27	3,790
			SNTA-Comp-20	9/13/2018	18.5-20.5	composite	5.91	259 J

Notes:
J - The reported result is an estimated value.
AFFF - aqueous film forming foam
bgs - below ground surface
ft - feet
ID - identification
mg/kg - milligrams per kilogram
S.U. - standard units
TOC - Total Organic Carbon

Table 3.1-3
Summary of Groundwater Analytical Results
Site Inspection of Aqueous Film Forming Foam (AFFF) Areas
Site Inspection Report, Vandenberg Air Force Base, Santa Barbara County, California

						Analyte	Perfluorooctane Sulfonate (PFOS)	Perfluorooctanoic Acid (PFOA)	PFOS + PFOA	Perfluorobutanesulfonate Acid (PFBS)	6:2 Fluorotelomer sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonate (8:2 FTS)	N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	Perfluorodecanoic Acid (PFDA)	Perfluorododecanoic Acid (PFDoA)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexane Sulfonate (PFHxS)	Perfluorohexanoic Acid (PFHxA)	Perfluorononanoic Acid (PFNA)	Perfluorotetradecanoic Acid (PFTeDA)	Perfluorotridecanoic Acid (PFTrDA)	Perfluoroundecanoic Acid (PFUnA)
						USEPA Health Advisory[1]:	**0.07**	**0.07**	**0.07**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**
						USEPA Tapwater RSL[2]:	**NL**	**NL**	**NL**	**40**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**
AFFF Release Area	**Area Description**	**Location ID**	**Sample ID**	**Sample Date**	**Sample Depth (ft bgs)**	**Sample Type**	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1	FT021 (Former FTA)	21-B-26[3]	21-MW-1	9/21/2018	9.0	N	**150**	**7.8**	**157.8**	1.1 J	5.8 J	11	1.0 U	1.0 U	1.5 U	1.0 U	2.2	21 J	7.9	1.7 J	1.0 U	1.0 U	1.0 U
			DUP-FT021-1	9/21/2018	9.0	FD	**150**	**8.2**	**158.2**	1.1 J	5.6	11	1.0 U	1.0 U	1.5 U	1.0 U	2.3	22	8.0	1.8 J	1.0 U	1.0 U	1.0 U
2	1992 Fuel Spill	1992FS-B-1	1992FS-MW1	9/21/2018	22.0	N	**0.65**	**0.071**	**0.721**	0.048	0.013 J	0.0080 J	0.010 U	0.010 U	0.015 U	0.010 U	0.037	0.38	0.11	0.018 U	0.010 U	0.010 U	0.010 U
		1992FS-B-2	1992FS-MW2	9/21/2018	29.0	N	**0.35**	0.063	**0.413**	1.1	0.038	0.015 U	0.010 U	0.010 U	0.015 U	0.010 U	0.21	2.1	0.93	0.0095 J	0.010 U	0.010 U	0.010 U
		1992FS-B-3	1992FS-MW3	9/25/2018	34.6	N	0.044	0.029	**0.073**	0.32	0.0074 J	0.015 U	0.010 U	0.010 U	0.015 U	0.010 U	0.070	1.1	0.24	0.018 U	0.010 U	0.010 U	0.010 U
3	2006 Fuel Spill	2006FS-B-1	2006FS-MW1	9/26/2018	69.5	N	0.013 J	0.010 UJ	0.013 J	0.068 J	0.015 UJ	0.015 UJ	0.010 UJ	0.010 UJ	0.015 UJ	0.010 UJ	0.015 UJ	0.13 J	0.010 UJ	0.018 UJ	0.010 UJ	0.010 UJ	0.010 UJ
			DUP-2006FS-1	9/26/2018	69.5	FD	0.015 UJ	0.010 UJ	ND	0.071 J	0.015 UJ	0.015 UJ	0.010 UJ	0.010 UJ	0.015 UJ	0.010 UJ	0.015 UJ	0.15 J	0.010 UJ	0.018 UJ	0.010 UJ	0.010 UJ	0.010 UJ
		2006FS-B-2	2006FS-MW2	9/26/2018	71.0	N	0.015 UJ	0.010 UJ	ND	0.045 J	0.015 UJ	0.015 UJ	0.010 UJ	0.010 UJ	0.015 UJ	0.010 UJ	0.015 UJ	0.075 J	0.010 UJ	0.018 UJ	0.010 UJ	0.010 UJ	0.010 UJ

Notes:

Highlighted cells indicate concentrations exceeding USEPA Health Advisory or USEPA Tapwater RSL.

[1]USEPA, May 2016a. "Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)" and USEPA, May 2016b. "Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)."

[2]USEPA Regional Screening Levels (November 2018) [https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables] based on a THQ of 0.1.

[3]The sample from 21-B2-6 is from water ponded in the excavation backfill; no groundwater was encountered at FT021.

J - The reported result is an estimated value.
U - The analyte was not detected above the LOD. Reported as not detected in text.
UJ - Not detected. The analyte was not detected above the reported LOD. The numerical value of the LOD is estimated.
AFFF - Aqueous Film Forming Foam
bgs - below ground surface
FD - field duplicate sample
ft - feet
ID - identification
LOD - limit of detection
µg/L - micrograms per liter
N - normal field sample
ND - non-detect
NL - no limit
RSL - Regional Screening Level
THQ - Target Hazard Quotient
USEPA - United States Environmental Protection Agency

Table 3.1-4
Summary of Sediment Analytical Results
Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas
Site Inspection Report, Vandenberg Air Force Base, Santa Barbara County, California

						Analyte	Perfluorooctane Sulfonate (PFOS)	Perfluorooctanoic Acid (PFOA)	Perfluorobutane Sulfonate (PFBS)	6:2 Fluorotelomer sulfonate	8:2 Fluorotelomer sulfonate	N-Ethyl perfluorooctanesulfonamidoacetic acid (NETFOSAA)	N-Methyl perfluorooctanesulfonamidoacetic acid (NMEFOSAA)	Perfluorodecanoic Acid (PFDA)	Perfluorododecanoic Acid (PFDoA)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexane Sulfonate (PFHxS)	Perfluorohexanoic Acid (PFHxA)	Perfluorononanoic Acid (PFNA)	Perfluorotetradecanoic Acid (PFTeDA)	Perfluorotridecanoic Acid (PFTrDA)	Perfluoroundecanoic Acid (PFUnA)
						Screening Level:	**0.126[1]**	**0.126[1]**	**130[2]**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**	**NL**
AFFF Release Area	**Area Description**	**Location ID**	**Sample ID**	**Sample Date**	**Sample Depth (ft bgs)**	**Sample Type**	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1	FT021 (Former FTA)	21-SD-1	21-SD1-0.5	9/14/2018	0.0 - 0.5	N	0.012	0.00066 J	0.00045 U	0.00071 U	0.00071 U	0.00045 U	0.00071 U	0.00067 J	0.00073 U	0.00046 J	0.0021	0.001	0.00033 J	0.00071 U	0.00046 J	0.00054 J
3	2006 Fuel Spill	2006FS-SD-1	2006FS-SD1-0.5	9/14/2018	0.0 - 0.5	N	0.064	0.00059 J	0.00047 J	0.00088 U	0.00088 U	0.00055 U	0.00088 U	0.00088 U	0.00080 U	0.00055 U	0.0051	0.00069 J	0.00055 U	0.00088 U	0.00088 U	0.00088 U
		2006FS-SD-2	2006FS-SD2-0.5	9/14/2018	0.0 - 0.5	N	0.037	0.00070 U	0.00032 J	0.00070 U	0.00070 U	0.00044 U	0.00070 U	0.00070 U	0.00067 U	0.00044 U	0.0031	0.00044 J	0.00044 U	0.00070 U	0.00070 U	0.00070 U
5	Spray Nozzle (Refractometer) Test Area	SNTA-SD-1	SNTA-SD1-0.5	9/13/2018	0.0 - 0.5	N	**0.930**	0.068	0.072 J	0.140	0.350	0.00021 J	0.00046 J	0.0035	0.0048	0.025 J	0.170	0.29 J	0.0039	0.0012	0.00077 J	0.0052
			DUP4-SNTA-0.5	9/13/2018	0.0 - 0.5	FD	**0.840**	0.057	0.038 J	0.130	0.320	0.00021 J	0.00048 J	0.0035	0.0044	0.017 J	0.130	0.2 J	0.0033	0.0011	0.00077	0.0048
		SNTA-SD-2	SNTA-SD2-0.5	9/13/2018	0.0 - 0.5	N	**1.7**	**0.250**	0.180	0.083	0.0042	0.00055 U	0.00088 U	0.0010 J	0.00088 U	0.052	0.880	0.400	0.0053	0.00088 U	0.00088 U	0.00088 U
		SNTA-SD-3	SNTA-SD3-0.5	9/13/2018	0.0 - 0.5	N	**2.2**	0.100	0.044	0.029	0.0019	0.00045 U	0.00072 U	0.00029 J	0.00072 U	0.018	0.440	0.130	0.019	0.00072 U	0.00072 U	0.00072 U

Notes:

Highlighted cells indicate concentrations exceeding USEPA Screening values.

[1]Screening levels based on residential scenario, were calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search] and a THQ of 0.1.

[2]USEPA Regional Screening Levels (November 2018) [https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables]

J - The reported result is an estimated value.
U - The analyte was not detected above the LOD. Reported as not detected in text.
AFFF - Aqueous Film Forming Foam
bgs - below ground surface
FD - field duplicate sample
ft - feet
ID - identification
LOD - limit of detection
mg/kg - milligrams per kilogram
N - normal field sample
NL - no limit
USEPA - United States Environmental Protection Agency

Table 4.0-1
Conceptual Site Model: Installation-Wide Summary
Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas
Site Inspection Report, Vandenberg Air Force Base, Santa Barbara County, California

Facility Profile	Physical Profile	Release Profile	Land Use and Exposure Profile	Ecological Profile
Installation Description/History (USAF, 2008)**:** • VAFB is an active USAF installation located in Santa Barbara County (**Figure 2.1-1**). The installation began as Camp Cooke Army Base in 1941, and following transfer to the USAF in October 1958, was redesignated VAFB. • VAFB is headquarters to the 30th Space Wing and is used for launching and tracking satellites, testing the intercontinental ballistic missile systems, and operate the Western Range. **AFFF Use:** • AFFF containing PFAS was used for firefighting training activities, testing of firefighting equipment, and extinguishing or preventing fuel fires. • The following five AFFF release areas were sampled under the Site Inspection (**Figures 2.3-1** and **2.3-2**): - AFFF Area 1 (FT021 [Former FTA]) - AFFF Area 2 (1992 Fuel Spill) - AFFF Area 3 (2006 Fuel Spill) - AFFF Area 4 (2009 AFFF Release) - AFFF Area 5 (Spray Nozzle [Refractometer] Test Area)	**Topography:** • VAFB occupies more than 98,000 acres on the south-central coast of California and is located approximately 50 miles north of Santa Barbara in Santa Barbara County. The Santa Ynez River bisects the Base into two sections, North Base and South Base. The western terminus of the Santa Ynez Mountains is within the Base. Elevations range from sea level along the coast, to over 2,000 feet above mean sea level at the Tranquillon Mountain peak (USGS, 2015). **Vegetation:** • Predominant vegetation includes mixed maritime chaparral with coastal sage scrub and oak woodland habitat intermixed with riparian systems (SRS Technologies, 2002). **Surface Water:** • VAFB contains or is adjacent to approximately 42 miles of coastline; 166 miles of perennial and ephemeral streams; and 5,000 acres of wetlands, vernal pools, and four artificial recreational lakes. The Base lies along the westernmost portion of three primary hydrologic units (HUs); listed from north to south, these are San Antonio Creek HU, Santa Ynez River HU, and South Coast HU. VAFB comprises 36 percent of the San Antonio Creek HU, 5 percent of the Santa Ynez River HU, and 9 percent of the South Coast HU. The HUs discharge to the Pacific Ocean within VAFB boundaries (USAF, 2012a). • Surface waters located on VAFB include Shuman Creek, San Antonio Creek, Santa Ynez River, Bear Creek, Cañada Honda Creek, and Jalama Creek. There are also numerous unnamed minor drainage basins that contain seasonal and ephemeral streams. The four artificial recreational lakes are Punch Bowl Lake and Upper, Middle, and Lower Pine Canyon Lakes. It is unknown whether these artificial lakes are lined. Other small ponds/lakes that exist on base are MOD III Lake, ABRES-A Lake, Bear Creek Pond, Spring Canyon Pond, Mitchell Pond, El Rancho Pond, and Lompoc-Casmalia Pond (USAF, 2012a). **Geology/Soils:** • Geology at VAFB is complex, characterized by folded and faulted bedrock units overlain by more recent unconsolidated sediments, including Pleistocene Orcutt Sand, Holocene alluvium, and Holocene dune sands. The unconsolidated geological units overlaying bedrock are widely variable, ranging from sands and gravels to silts and clays (ARCADIS, 2014). • Bedrock units (diatomaceous shale formations) are exposed where predominant ravines are carved into terraces by fluvial action. Bedrock also outcrops in areas along the coast (ARCADIS, 2014). • Bedrock was encountered at the following depths: - AFFF Release Area 1 (FT021) – 20 to 35 feet below ground surface (ft bgs) - AFFF Release Area 2 (1992 Fuel Spill) – Not encountered; total boring depth was 35 ft bgs - AFFF Release Area 3 (2006 Fuel Spill) – Not encountered; total boring depth was 74 ft bgs - AFFF Release Area 4 (2009 AFFF Release) – 32 and 34 ft bgs - AFFF Release Area 5 (Spray Nozzle [Refractometer] Test Area) – 20 ft bgs **Hydrogeologic Setting:** • Depth to the perched groundwater varies, dictated by surface	**Contaminants of Potential Concern:** • PFAS are the contaminants of potential concern for this investigation; however, fuel related compounds and chlorinated solvents are historic site contaminants at AFFF Area 1 FT021 (Former FTA). **Media of Potential Concern:** • Groundwater, soil, and sediment. **Confirmed AFFF Releases:** • AFFF Area 1 (FT021 [Former FTA]): PFOS, PFOA, and PFBS were detected in surface and subsurface soil. PFOS was detected at concentrations above the calculated RSL in the surface soil sample at one sample near the unlined drainage ditch and a subsurface soil sample collected below the former excavation area at 4.2 to 4.7 ft bgs. PFOS, PFOA, PFOS + PFOA, and PFBS were detected in excavation backfill water. PFOS, PFOA, and PFOS+PFOA were detected at concentrations above the USEPA HA. PFOS and PFOA were detected in sediment at concentrations below the calculated RSL. • AFFF Area 2 (1992 Fuel Spill): PFOS and PFOA were detected in surface and subsurface soil at concentrations below the calculated RSLs. PFOS, PFOA and/or PFOS + PFOA were detected in groundwater at concentrations above the USEPA HA. PFBS was detected in groundwater at concentrations below the USEPA Tap Water RSL. • AFFF Area 3 (2006 Fuel Spill): PFOS, PFOA, and PFBS were detected in surface soil at concentrations below the calculated RSLs at all sample locations. PFOS and PFOS + PFOA were detected in groundwater at concentrations below the USEPA HA. PFBS was detected in groundwater at concentrations below the USEPA Tap Water RSL. PFOS, PFOA, and PFBS were detected in the sediment samples at concentrations below the calculated RSL and USEPA RSL, respectively. • AFFF Area 4 (2009 AFFF Release): PFOS, PFOA, and/or PFBS were detected in surface soil and/or subsurface soil. Only PFOS was detected at concentrations above the calculated RSL in one surface soil sample. • AFFF Area 5 (Spray Nozzle [Refractometer] Test Area): PFOS, PFOA, and PFBS were detected in the surface soil at concentrations above the calculated RSL and USEPA RSL at both sample locations. PFOS, PFOA, and PFBS were detected in all three sediment samples. PFOS concentrations exceeded the calculated RSL at both surface soil sample locations and all three sediment sample locations. PFOA concentrations exceeded the calculated RSL at one sample location. **Primary Releases:** ***Soil*** • PFAS that may have been released to the ground surface may be adsorbed to surface and subsurface soil particles. • PFAS released on paved areas may have migrated to grassy areas adjacent to pavement to adsorb to surface and subsurface soil particles. ***Groundwater*** • PFAS that were released to the ground surface may have migrated into groundwater beneath and downgradient of the site.	**Current Landowners:** • USAF **Current Land Use:** • Land is currently occupied by VAFB and current land use is military, industrial, commercial, and open space. **Future Land Use:** • Land use is not expected to change in the future. **Potential Receptors:** • Potential receptors associated with current and future land use include USAF personnel, residents, site workers, site visitors, and/or trespassers.	**Potential Ecological Receptors:** • Plants, birds, insects, soil invertebrates, mammals, and marine life that inhabit or migrate through the area or in the adjacent waters of the Pacific Ocean (CH2M Hill, 2015). **Threatened and Endangered Species:** • VAFB covers an area that is home to sensitive and special-status plant and animal species, as well as waters and wetlands that are under the jurisdiction of federal and state agencies including the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service (CH2M Hill, 2015). • The following federally and/or state listed threatened and endangered species are known to exist at VAFB (CH2M Hill, 2015): - Frog, California Red-legged – Amphibian - Flycatcher, Southwestern Willow – Bird • Plover, Western Snowy – Bird - Tern, California Least – Bird - Fairy Shrimp, Vernal Pool – Crustacean - Goby, Tidewater – Fish - Steelhead, Southern California Population – Fish - Stickleback, Unarmored Three-spine – Fish - Butterfly, El Segundo Blue – Insect - Sea Otter, Southern – Mammal - Abalone, Black – Mollusk - Layia, Beach – Plant - Monkeyflower, Vandenberg – Plant - Tarplant, Gaviota – Plant - Watercrest, Gambel's – Plant - Yerba Santa, Lompoc – Plant • Sea Turtle, Leatherback – Reptile

Facility Profile	Physical Profile	Release Profile	Land Use and Exposure Profile	Ecological Profile
	topography and depth to bedrock. In areas with higher surface elevations depths to groundwater approach 250 feet, while at lower elevations the groundwater occurs at or near the ground surface. The upper portions of the bedrock are considered unsaturated, with the regional water table found much deeper within the bedrock formations (ARCADIS, 2014). • The shallow perched groundwater system is recharged via infiltration of precipitation and surface water, while the deeper regional groundwater within the bedrock is likely recharged in the surrounding areas of higher elevation with outcropping bedrock. The differing recharge mechanisms contribute to vertical separation of the shallow perched groundwater from the deeper regional groundwater, and the two units are therefore not believed to be in communication (ARCADIS, 2014). • Groundwater was encountered between 18 and 35 ft bgs at AFFF Release Area 2 (1992 Fuel Spill) and at 69 and 71 ft bgs at AFFF Release Area 3 (2006 Fuel Spill) in September 2018. • Water was encountered at 9 ft bgs in the former excavation backfill and groundwater was not encountered outside of the excavation backfill at FT021 in September 2018. The ROD (USAF, 2008) for FT021 indicated no groundwater is present at the site. • Groundwater was not encountered at 2009 AFFF Release and the Spray Nozzle (Refractometer) Test Area in September 2018. **Meteorology:** • VAFB lies within a coastal Mediterranean climate, with warm summers and mild winters. Precipitation in the area averages about 14 inches of annual rainfall and primarily occurs from November through March (NOAA, 2017).	• The extent of PFAS migration in groundwater downgradient of the site is unknown. **Secondary Releases:** ***Soil*** • PFAS that may have been adsorbed to surface soil at AFFF Release Area 1 (FT021), which was removed between 2004 and 2006 and replaced with clean backfill material. ***Sediment*** • PFAS adsorbed to surface soil particles may have migrated during surface water runoff events to locations outside of the primary release areas.		

References:

ARCADIS, 2014. Project Management Plan, Performance-Based Remediation. October.

CH2M Hill, Inc. (CH2M Hill), 2015. Final Preliminary Assessment Report for Perfluorinated Compounds at Vandenberg Air Force Base, Santa Barbara County, California. November.

National Oceanic and Atmospheric Administration (NOAA), 2017. Climate Data Online (https://www.ncdc.noaa.gov/cdo-web/).

SRS Technologies, 2002. Final Environmental Assessment, Management Actions for Suppression of the Peat Bog Fire at Barka Slough, Vandenberg Air Force Base, California. August.

United States Geological Survey (USGS), 2015. Tranquillon Mountain, CA 7.5-minute quadrangle map. Scale 1:24,000.

United States Air Force (USAF), 2008. Final Record of Decision/Remedial Action Plan, Site 21 – Fire Training Area, Operable Unit 4, Vandenberg Air Force Base, California. August.

USAF, 2012a. Storm Water Management Plan, Vandenberg AFB. April.

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APPENDIX A

PHOTOGRAPH LOGS

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Photo 1: OTIE geologist performing soil characterizations from split-spoon soil core at 21-B-27. (9/10/18)

Photo 2: View of the distinct sharp contact between native soil and weathered bedrock in the split-spoon sampler soil core at 21-B-27. (9/10/18)

Photo 3: Hand augering, air monitoring using a PID, and shallow soil sample collection at SNTA-B-1. (9/11/18)

Photo 4: Decontamination and equipment trailer positioning at SNTA-B-1. (9/11/18)

Photo 5: View of the distinct sharp contact between native soil and weathered bedrock in the split-spoon sampler soil core at SNTA-B-1. (9/11/18)

Photo 6: View of the distinct sharp contact between native soil and weathered bedrock in the split-spoon sampler soil core at SNTA-B-28. (9/13/18)

Photo 7: S/G drillers removing hollow stem augers due to heaving sands during drilling at 1992FS-B-2. (09/17/18)

Photo 8: S/G drilling crew constructing a monitoring well at 1992FS-B-3 and decontaminating the split spoon sampler using a PFAS-free water sprayer. (9/18/18)

Photo 9: View of delineated work area during drilling activities at 1992FS-B-3. (09/18/18)

Photo 10: Foamy purged groundwater from 199FS-B-3 during well development. (9/20/18)

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APPENDIX B

FIELD FORMS

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APPENDIX B-1

FIELD ACTIVITY DAILY LOGS

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OTIE

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	FT021
Technician Name:		**Date and Time:**	9-10-2018; 0730
Personnel Onsite:	Mark Wanek (OTIE); Rachel Ofili (OTIE); Tim Blakeley (S/G); Nathan Navarro (S/G) Nick Dean (S/G)		
Weather Conditions:	foggy, cool		

Description of Daily Activities and Events:

0730 Met Rachel Ofili (OTIE) at VAFB Visitor's Center. Mob'd to IRP Office to show Rachel where to meet Manju (DTSC) on Wed. (9/12). Mob to Site FT021.

0800 Met w/ driller; crew from S/G Drilling.

0805 Conduct tailgate H&S mtg and PFAS SOP checklist.

0815 Luanne Lum (AFCEC) on-site to conduct weed seed inspection of rig and accompanying vehicles. Vehicles passed inspection. (gravel)

0835 Mob to Site 21-B-26. Hand auger refusal @ 1.5'. Switch to post-hole digger and clear hole until 3½' (refusal on large rock).

0850 Begin drilling 21-B-26. (cont'd on pg 2)

List Samples Collected:

~~26-TMW~~ - 21-B-26-4.2 MW

- 21-B-27-8.5 MW
- EQB1-091018

Deviation from Plans:

None

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
Luanne Lum (AFCEC/Wetlands)	• Photo 091018-01: backfill-native soil interface	Mark Wanek
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/12/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-10-2018	**Investigation Area:**	FT021

Description of Daily Activities and Events:

1015 Encountered water in boring at ~~[illegible]~~ 7.5' bgs. Collected soil sample near soil-H_2O interface at 4.2' (21-B-26-4). Allowed water to come in

1030 Measured DTW in auger at ~6'. Set well at 13½'. (see attached well constr. diagram).

1100 Finish setting well. Measured DTW at 3.51' bgs. "MW-1"

1130-12 Lunch break

12:00 Mob to 21-B-27. Hand auger to 3½' (refusal on rocks).
Begin drilling 21-B-27. Encountered gw (perched) ~6' bgs.
Collect soil sample 21-B-27-8.5 near soil-gw interface

1330 Encounter bottom of backfill @ ~13.4' bgs (Photo 09108-01), underlain by silty fine sand. Continue drilling until bedrock, per ISWP.

1430 Encountered weathered bedrock ~35'. Continue drilling 1 more run to be sure bedrock encountered.

1510 Terminate boring at ~43' bgs. Backfill with bentonite-cement grout
$V_{boring} = \pi r^2 h$ $r = 4''$ $h = 43'$ $V = 112$ gal

1715 Complete grouting boring with 130 gal bent-cement grout

1720 Off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
See pg 1	See pg 1	Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/12/2018

OTIE

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 – 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	FT021 / SNTA
Technician Name:	Mark Wanek	**Date and Time:**	9-11-2018 ; 0715
Personnel Onsite:	R. Ofili, O. Martinez, T. Blakeburn, N. Navarro, N. Dean		
Weather Conditions:	foggy, cool (55°F) am to sunny, warm (68°F) in pm		

Description of Daily Activities and Events:

0705 Arrive at Site FT021. Meet w/ Rachel Ofili (OTIE) ; Oscar Martinez (OTIE)
0710 Drillers Tim Blakeburn, Nick Dean, ; Nate Navarro on-site, after extra time to go through inspection line at Gate, Conduct tailgate H&S mtg + PFAS SOP Checklist (see attached). Walk out to 21-B-28 with Tim (driller) to establish accessibility and pathway to boring. Tim said location ~~or it~~ is not accessible to support trucks. Must get skip loader or backhoe to clear vegetation and ~~temp~~ compact soil to allow trucks to get back there. Oscar, Tim, Jennifer Harding & I conferred and decided to put boring 21-B-28 back until access clearing can be scheduled.

List Samples Collected:

- SNTA-SB1-0.5
- SNTA-SB1-20
- EQB2-091118

Deviation from Plans:

~~None~~ MW Moved soil boring ~~SB~~ MW SNTA-SB-1 ~ 4' SW to move away from electrical line and trash pile.

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
~~None~~ MW Oscar Martinez (OTIE)	· Jennifer Harding (OTIE) - conference about scheduling access clearance at 21-B-28 and which site to go to next.	[signature]
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/12/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-11-2018	**Investigation Area:**	FT021 / SNTA

Description of Daily Activities and Events:

0835 Oscar performed internal QC Audit of our sampling practices and documentation. Need SDS for cal gas (isobutylene), PFAS, and cert for PFAS-free H_2O.

0900 Called Airfield Ops to schedule flightline training for M Wanek & driller & also to see if we can drill 2009 AFFF Release Area tomorrow. Scheduled FL training for 1130-1200. Affirmative for area to drill tomorrow. Regulators/auditors okay to come on-site to observe.

Mbt to DRMO/Recycle Yard to get pallets to stage drums on at FT021. Talked to Doug Recycle Yard Mgr - said okay to take as many pallets as needed. Hauled 10 pallets off to FT021 site.

1015 Mbt to FT021 to stage drums on pallets while Rachel goes to Main Gate area to meet electrical to mark out lines near visitor welcome sign. Boring must move to >5' from electrical line. Rachel attempt to get back on Base w/ CAC / notified CAC was terminated. Rachel to Visitor Center / Pass office to pick up temp visitor badge while MWanek to meet electrical at 2009 AFFF Release Area. Borings as marked too close to electrical line, moved ~3' S towards asphalt pavement. Called TSgt Quackenbush to make sure SNTA unlocked. (see below)

1100 Driller mbt to SNTA. Electrical to SNTA to clear. SNTA-B-1 moved ~4' SW (towards mock airplane) to clear >5' from line, and away from large debris/trash pile.

1125 Mbt to Airfield Ops for Flightline Training / driver pattern.

1230 Set up on SNTA-B-1 after clearing work area of debris and trip hazards.

Visitors on Site:	**Important Telephone Calls / Photos Taken:**	**Technician Signature:**
Oscar Martinez (OTIE) ~~Hotel~~ MW	• TSgt Quackenbush (VAFB Fire): called to confirm access to SNTA. He said okay, other contractors are also here coming in/out so leave unlocked all week.	**Technician Name (print):** MARK WANEK

QA/QC'd by: **QA/QC Date:** 9/12/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-11-2018	**Investigation Area:**	SNTA

Description of Daily Activities and Events:

1305 Collect sfc soil sample SNTA-SB1-0.5 from decontaminated hand augers. Hand auger to 5'.

1415 Encounter sand/weathered bedrock interface at 20.5' (sharp contact - see boring log). Collected SNTA-SB-20.5 above contact. (Photo 091118-01)

1430 Terminate boring at 28' bgs. No groundwater encountered

Grout boring: $V_{Boring} = (0.0408)(8")^2(28') = 73$ gal

1630 Complete grouting w/ 100 gal of bent-cement grout

1650 Off-site

Visitors on Site:	**Important Telephone Calls / Photos Taken:**	**Technician Signature:**
Oscar Martinez (OTIE)	• Photo 091118-01: soil-WBr interface Boring SNTA-B-1	
		Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/12/2018

OTIE

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Investigation Area:**	SNTA/ 2009 AFFF- B Release Area
Technician Name:	Mark Wanek	**Date and Time:**	09-12-18; 0745
Personnel Onsite:	M. Wanek + B. Hastings + S. Ofili + T. Blakeborne + N. Dow + N. Navarro		
Weather Conditions:	foggy, cool am → warm, sunny		

Description of Daily Activities and Events:

0745: Arrive on-site (SNTA) and meet w/ Rachel, Oscar; S/G Personnel (Tim, Nick, Nate)
Conduct Tailgate H&S mtg; PFAS Checklist (see attached)
S/G fills tanks with water and gathers eq't to move to
2009 AFFF Release area. Take soil drums to FT021 staging area
0820 Mov to AFFF Release Area, Perform FOD check and set up at
2009AFFF-B-2 (East end of grass @ apron South of H1735).
0855 Set up EZ, CRZ, SZ
0945 Collect surface soil sample at 2009AFFF-B-2. Wait at bottom of auger @ 5'.
~~09~~ 1015 Begin drilling. DTSC (Manju), ~~RWQCB~~ RWQCB (Don) and AFCEC Representative
on-site to observe drilling/sampling activity. Don asked about

List Samples Collected:

- 2009 AFFF-B2-0.5 (0945)
- 2009AFFF-B2-33.5 (1200)
- 2009AFFF-B1-0.5 (1310)
- ~~2009~~ EQB3-091218 (1330)
- 2009AFFF-B1-31.5 (1535)
- DUP3- 2009AFFF-~~B~~ 31.5 (1540)
- 2009AFFF-COMP-0.5 (1325)
- 2009AFFF-COMP-32 (1600)

Deviation from Plans:

Borings 2009AFFF-B-1 and 2009AFFF-B-2 moved from planned location ~ 2-3' South to give 5' radius from electrical line.

Visitors on Site:

Jeff Holston (AFCEC)
Manju Chakrabarti (DTSC)
Don Ely (RWQCB)
Oscar Martinez (OTIE)

Important Telephone Calls / Photos Taken:

· call w/ Jennifer Harding (OTIE) affirming that a 3' bentonite seal should be placed above filter pack on temp wells.

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	09-12-2018	**Investigation Area:**	2009 AFFF Release Area

Description of Daily Activities and Events:

steps we take to minimize cross-contamination. Oscar showed the group the PFAS-SOP checklist and explained procedures. Manju asked about history of this location (reason for sampling) and how many other sites have at VAFB we have. I showed her the 5 Investigation areas. Discussion of sampling depths per ISWP.

1130 DTSC, ~~RWQ~~ mw RWQCB, and AFFEC. off-site Water encountered at ~5-6' was only minor lens of (likely) irrigation water ~4'-5" so no well or sample at water/vadose zone interface appropriate. Continued drilling until bedrock encountered

1200 Encountered weathered bedrock @ ~34' bgs. Collected soil sample 2009AFFF-B2-33.5 above bedrock. Confirmed bedrock in next run. Terminated boring at 43.5'. ~~Backfilled~~ mw

1300-1330 Lunch break

1330-1445 Backfill 2009AFFF-B-2 with 135 gal of bent.-cement grout and ~~1445~~ mw move to 2009AFFF-B-1. OTIE Hand cleaned 2009AFFF-B-1 during grouting and collected surface soil sample 2009AFFF-B1-0.5.

1445. Begin drilling at 2009AFFF-B-1. Equipment blank collected on hand auger

1535 Encountered weathered bedrock at 32' in 2009AFFF-B-1. Collected sample directly above interface and field duplicate. Terminated boring 2009AFFF-B1 at 34' bgs. Backfilled boring with bent.-cement grout. (125 gal)

1715 Depart 2009AFFF Release Area / Flightline and move to FT021 to top off 21-B-27 w/ leftover grout

1815 off site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
See pg 1	See pg 1	
		Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/17/2018

OTIE

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	SNTA / FT021
Technician Name:	Mark Wanek	**Date and Time:**	09-13-2018 0745
Personnel Onsite:	M. Wanek + R Ofili (OTIE), T. Blakeboro, N. Navarro, N. Dean (S/G)		
Weather Conditions:	cool/foggy am → warm, sunny pm		

Description of Daily Activities and Events:

0730 Arrive at FT021 site to arrange drums on pallets and decon augers prior to mobilizing to SNTA.

0745 Conduct Tailgate H&S mtg and review PFAS SOP checklist. Emphasis on slip-trip-fall, as a piece of unprotected rebar in parking area at 2009 AFFF Release yesterday nearly tripped employee before being covered w/ delineator. S/G proceeds to arrange drums on pallets and decon augers

0815 Mob to SNTA-B-2

0845 Collect surface soil sample at SNTA-B-2 with hand auger

0850 Hand auger breaks (bucket tears off handle). Resume w/ post hole digger

List Samples Collected:

- SNTA-B2-0.5
- SNTA-B2-19
- SNTA-SD1-0.5
- SNTA-SD2-0.5
- SNTA-SD3-0.5
- Dup4-SNTA-0.5
- 21-B28-0.5
- 21-B28-19
- 21-COMP-0.5
- 21-COMP-20
- SNTA-COMP-0.5
- SNTA-COMP-20
- EQB4-091318

Deviation from Plans:

- Top 3' of SNTA-B-2 and 21-B28 cleared for utilities due to refusal by geofab liner and rocks/roots, respectively.

Visitors on Site:

None

Important Telephone Calls / Photos Taken:

1) Spoke w/ Stephanie Pollen (Maxxam) about shipping. She recommended shipping samples on Monday, 9-17-18 to avoid possibility of samples accidentally arriving late and sitting in Depot over the weekend.

2) Photo 091318-01: Soil/weathered bedrock contact in 21-B-28 @ ~19½'

Technician Signature:

Mark Wanek

Technician Name (print):

Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-13-2018	**Investigation Area:**	SNTA / FT021

Description of Daily Activities and Events:

Post hole digger encounters refusal ~3' on geofab liner underneath road base surface of ~~FNTA~~ CFTA. Carefully advance auger past liner.

1000 Encounter bedrock at ~19.5' in SNTA-B-2. ~~Cob~~ No gw encountered. Collect subsurface soil sample ~19.0-19.5 and complete composite sample.

Collect sediment samples at SNTA-SD1, SNTA-SD-2, and SNTA-SD-3 with a bucket of hand auger. Because no H_2O encountered in either SNTA-B-1 or -2, there is no need to drill boring at SNTA-B-3 ⇒ sediment sample only.

10.30 - 11.30 Grout boring SNTA-B-2 w/ 125 gal of bent-cement grout.

1130 - 1200 Lunch break

1200 Mob to FT021, Skip loader there, delivered earlier. Tim R. Clears / tamps down brush along channel route to 21-B-28.

1245 Mob trucks and rig into drilling area and collect surface sample

1325 Hand dig top 3' of 21-B-28 with post hole digger. Refusal at 3' on rock or large root. Begin drilling

1430 Encounter bedrock at ~19½' in SNTA-B-28. Collect subsurface soil sample at soil-bedrock interface, ~19-19.5'

Complete composite of 21-B-26, -27, and -28 subsurface samples

~~Grout~~ NW OTIE collects equipment rinsate blank on cleaned shoe of core barrel. S/G grouts boring with 115 gal of bent-cement grout.

1630 Decon augers and stage drums on pallets.

1700 Off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	See pg 1	Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/17/2018

OTIE
An Orindo ESC Group Company

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 -07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Investigation Area:**	2006 AFFF Release
Technician Name:	Mark Wanek	**Date and Time:**	09-14-2018; 0750
Personnel Onsite:	OTIE: M. Wanek + R. Ofli; S/G: T. Blakebroe, N. Navarro, J. Dean		
Weather Conditions:	cool, foggy a.m. (57°F) → warm, sunny p.m. (67°F)		

Description of Daily Activities and Events:

0730 Arrive at FT021. Met w/ Rachel & drill crew. They need to fill up water tanks to take to 2006FS site since there is no avail water there. Two Go get water from hydrant at SNTA; return.

0750 Conduct tailgate H&S meeting; review PPHS SOP checklist. Emphasize traffic safety. OTIE collects surface & sediment samples 21-S-14, 21-S-15, and 21-SD-1 while S/G preps to move to 2006FS, outside Pine Canyon Gate.

0910 Begin hand augering at 2006FS-B-1, ~~about~~ NW northernmost boring location. Note: New hand auger brought to site this morning, since yesterday's broke. Sandy soil encountered until ~48' (see boring log)

1130 Encounter ~6-8" of wet sand atop ~6-8" fine-grained layer at ~41' bgs.

List Samples Collected:

- 21-S14-0.5
- 21-S15-0.5
- 21-SD1-0.5
- Dup1-FT021-0.5
- 2006FS-B1-0.5 (0915)
- 2006FS-B1-41
- 2006FS-B2-0.5
- 2006FS-B2-33
- 2006FS-COMP-0.5
- 2006FS-COMP-37
- 2006FS-SD-1
- 2006FS-SD-2
- EQBS-091418

Deviation from Plans: Note: Culvert draining 2006 Fuel Spill area extends to base of natural drainage north of 2006 FS. Sediment sample collected in front of culvert at outlet per plan, but location of 2006FS-SD-2 is actually further N and W than depicted on Figure 6 of ISWP.

Visitors on Site:

None

Important Telephone Calls / Photos Taken:

- Called J. Harting (OTIE PM) to discuss setting well in 2006FS-B-1, even though gw encountered was not very much (6"-8" of wet soil column). DQOs support capturing 1st water, so decided to set well.

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-14-18	**Investigation Area:**	2006 Fuel Spill

Description of Daily Activities and Events:

(cont'd from pg 1)

underlain by moist sand. Discussed w/ PM J. Harding (see pg 1) whether to continue drilling or try and capture this 1st water in a well. Decided to set well 37.5-47.5' (see attached well construction diagram) to align with DQO. Raised auger ~1' ~~to~~ and waited ~25 min to see if free water would enter boring in measurable quantity.

1200 Tagged bottom of hole with DTW meter at 48.0' and no measurable water present in boring. Will construct well and let sit over weekend to see if water comes in.

1200-1230 Lunch

1230-1330 Construct well and decon augers (see well const. diag. for details)

1330 Mob to 2006FS-B-2. Drop DTW meter down 2006FS-MW-1 to see if any water has flowed in - no water yet.

1430 Collect sediment samples at 2006FS-SD-1 and -2 while drillers are advancing 2006FS-B-2. Note: there is a lot of poison oak on the north side of the highway connector. Found a path down to the culvert outlet with no poison oak near the left side of the culvert outlet on the N side of the SR 1 connector.

1525 Encountered gw in 2006FS-B-2 at ~33.5' bgs. Construct monitoring well 2006FS-MW-2. Collect soil sample 2006FS-B2-33 and EQ blank on shoe of core barrel.

1650 Drop drums at FT021 Laydown

1725 Off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	See pg 1	Mark Wanek
		Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/17/2018

OTIE

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	1992 Fuel Spill
Technician Name:	Mark Wanek	**Date and Time:**	09-17-2018; 0710
Personnel Onsite:	OTIE: M. Wanek + R. Ofili ; S/G: T. Blakeburn, N. Navarro, N. Dean		
Weather Conditions:	foggy, cool (am) → warm, sunny (pm)		

Description of Daily Activities and Events:

0710 Arrive on-site at FT021 Laydown. Conduct tailgate H&S mtg; review PFAS SOP checklist (see attached). Extra Topics are delineating work zone since we will be in an area where public can access. Down auger from Friday

0735 Mob to Main Gate area. Stopped at 2006FS area to check for water in wells 2006FS-MW-1 and -2. No water present. Continue to Main Gate (1992 Fuel Spill). Set up on 1992FS-B-1

0910 Begin hand augering boring to clear for utilities. Collect surface soil sample and duplicate (see below).

List Samples Collected:

- 1992FS-B1-0.5
- ~~MW~~ Dup2 - 1992FS-0.5 - EQB6-091718
- 1992FS-B1-18
- 1992FS-B2-0.5
- 1992FS-B2-28.5

Deviation from Plans:

None

Visitors on Site:	**Important Telephone Calls / Photos Taken:**	**Technician Signature:**
None	None	[signature]
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/20/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	~~TH~~ FRI 17 Sept 2018	**Investigation Area:**	1992 FS

Description of Daily Activities and Events:

1005 Encounter gas at ~18.4' in 1992-B-1 Constant, temp monitoring well 1992-MW-1.

1130-1200 Lunch

1215 Mob to 1992FS-B-2. Hand auger top 5' and collect surface soil sample.

~~to~~ 1400 Soil core appears wet at ~34'. Soil missing (no recovery) in immediate run above so collect soil sample at 28.5'-29'. Try DTW inside auger at 34.8'. Drill next run to 43.5' to install well when encounter heaving sand inside auger locking up sampler barrel inside auger. Must pull entire drill string out to get core barrel out of lead auger.

1530 Pull lead auger out with core barrel stuck inside. Crew cannot get barrel out without tools at their shop. Load up auger / barrel and clean up site for the day.

1630 Transport drums to FT021 laydown area

1700 Off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	None	[signature]
		Technician Name (print): Mark Wanek
QA/QC'd by: [signature]	QA/QC Date: 9/20/2018	

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 • 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Investigation Area:**	1992 FS / 2006 FS
Technician Name:	Mark Wanek	**Date and Time:**	09-18-18; 0730
Personnel Onsite:	R. Ofili, M. Wanek, T. Blakeley, N. Dean, N. Navarro		
Weather Conditions:	cloudy, cool am (55°) → cool, sunny pm (64°F)		

Description of Daily Activities and Events:

0730 Arrive at 1992 Fuel Spill area. Meet w/ S/G Drilling Contract tailgate H:S meeting. review PFAS checklist, and discuss objectives for the day. Crew working to dislodge core barrel from lead auger. Because set-up for wood plug to avoid heaving sands for 1992FS-B-2 will take ~30 min to change, decided to drill; sample 1992FS-B-3 first.

0800 Hand auger top 5' and collect surface soil sample at 1992FS-B-3. Tagged open borehole 1992-B-2 at 33'. Measured DTW in 1992-B-2 open hole at 26.8' bgs. Measured DTW in well 1992FS-MW-1 at 17.8' bgs.

0910 Encountered gas in 1992-B-3 @ 24' bgs. Collect subsfc soil sample

List Samples Collected:

- 1992FS-B3-0.5
- 1992FS-B3-23.5
- 1992FS-COMP-0.5
- 1992FS-COMP-21
- 2006FS-B1-64.3
- EQB7-091818

Deviation from Plans: None

Visitors on Site: None

Important Telephone Calls / Photos Taken:

- Discussion w/ J. Hartley (OTIE) and Jacques Marcillac re: DTW difference in 1992FS-B-1 (18') and B-2 (27'). Decided water in B-1 is perched and perhaps mounded due to irrigation of grass at B-1. Also topography may influence difference.

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/20/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-18-18	**Investigation Area:**	1992FS / 2006FS

Description of Daily Activities and Events:

0910 (cont'd)	at gw - release interface (capillary fringe). Set well 1992FS-MW-3 at 33.5' bgs.
~~0950~~ mw 1030	Mob to 1992 FS MW-2/B-2. Switch over to cable rod system and drill down to 35' with wood plug DTW measured again at ~27' bgs in open hole, prior to drilling. Set well w/ TD = 35' bgs.
1230 - 1300	Drillers take lunch; MW(OTIE) to DRMO yard to obtain more pallets to store drums at FT021
1330	Mob to 2006FS area to advance boring deeper to water or bedrock. Check for water in existing 2006FS-MW-1 and -2. No water
1430	Set up on 2006FS-B-1. existing TD of 48'
1605	Encounter gw at ~65' in the soil core. Collect new subsurface composite 64.3'. Rented off-site to ship samples. Set well TD = 73.5' bgs.
1730	Collect Eq'c blank on core barrel sleeve (EQB7-091818)
1810	Off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	See pg. 1	Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/20/2018

OTIE
An Amec FW Group Company

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	2006 FS / FT021
Technician Name:	Mark Wanek	**Date and Time:**	09-19-2018; 0645
Personnel Onsite:	M. Wanek, R. Ofili, T. Blakeborn, N. Dean		
Weather Conditions:	cool am (55°F) → breezy; cool pm (65°F)		

Description of Daily Activities and Events:

at 2006 Fuel Spill Area.

0645: Arrive on-site. Meet with drillers. Conduct tailgate H&S meeting; Review daily PFAS protocols. Drillers finish removing & making surge above well seal in 2006FS-B-1 / MW-1

0800 Measure TD = 73.5' and DTW = 66.3' bgs. Drillers decon augers and clean up site.

0900 Transport drums to staging / daydown area at FT021.

1010 Drillers off-site. Mob to Lompoc to get supplies for well development

1230 Set up at FT021 to develop 21-MW-1 (B-26).

Surge & bail 21-MW-1. Water very muddy. Bail 10 gal (6 casing volumes of water).

List Samples Collected:

None

Deviation from Plans:

None

Visitors on Site:	**Important Telephone Calls / Photos Taken:**	**Technician Signature:**
None	Confer with Jennifer Hartley (OTIE PM) to ~~get~~ schedule drillers to come back Monday (9/24) to deepen 2nd well at 2006 FS Area.	Mark W
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/21/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-19-2018	**Investigation Area:**	2006 FS / FT021

Description of Daily Activities and Events:

1530 Switch to pump. Purge another 40 gal until water below 50 NTUs

1640 Transport water to drums on pallets at Laydown Area

1710 off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	See pg 1	Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/21/2018

OTIE
An Dynamic ESC Group Company

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	1992 FS / 2006 FS
Technician Name:	Mark Wanek	**Date and Time:**	9.20.18; 0730
Personnel Onsite:	R. Ofili + M. Wanek		

Weather Conditions: cool, foggy am (55°F) → warm, sunny pm (71°F)

Description of Daily Activities and Events: Well Development

0730: Arrive at FT021 Laydown area. Conduct Tailgate H&S mtg & review Daily PFAS SOP checklists. Set up for well development at 1992 Fuel Spill area. Will need more drums if wells are tested and require more purging like 21-MW-1. Called S/G to see if they can sell us 3 drums, and to confirm drilling schedule next week (see below).

0915 Mb to S/G to pick up drums and to Home Depot for more tubing. Picked up 3 drums from S/G.

1100 Set up on 1992 FS-MW-1. DTW = 17.32' / TD = 26.2' below ground sfc

1135 Surge and bail 1992FS-MW-1. Remove ~10 gal H_2O (6 casing vol)

List Samples Collected:

None

Deviation from Plans:

None

Visitors on Site:	**Important Telephone Calls / Photos Taken:**	**Technician Signature:**
None	• Called Julie Gray to confirm Monday's drilling schedule and ask for 3 drums. Monday is confirmed & 3 drums okay to pick up. • Photo 092018-01: foamy water in bucket from 1992FS-MW-1.	[signature]
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/21/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	09-20-2018	**Investigation Area:**	1992 FS / 2006 FS

Description of Daily Activities and Events:

1220 Begin pumping 1992FS-MW-1 at 1 gal/min. Purged well dry and wait for recharge. Water very muddy/foamy.

1255 Move to 1992FS-MW-2 while 1992FS-MW-1 recharges. Tag DTW = 25.16' and TD = 34.8' bgs.

1315-1325 Surge water column in 1992FS-MW-2.

1325 Begin bailing. Water very muddy/sandy.

1350 Well bailed dry after ~3 gal (2 casing volumes). Wait for 80% recharge (@DTW = 27.1') Move to 1992FS-MW-1 to see if water has recharged, while it has. Pump 1992FS-MW-1 at ~1L/min for ½ hr until below 50 NTUs consistently.

1430 Move to 1992FS-MW-3 Surge and bail after tagging DTW (26.48') and TD (33.5') bgs.

1450 Measured DTW in 1992FS-MW-2 at 28.42, not 80% yet after 1 hr

1500 Bail 1992FS-MW-3 dry after 5 gal. (~1½ casing volume)

1550 Move to 1992FS-MW-2 to check recharge. DTW = 27.72, not 80% recharge after 2 hrs. Surge 5 min and bail dry again after ~3 gal.

1640 Move to 2006FS-MW-1. Tag DTW = 66.21 and TD = 73.4. Surge ~10 min and bail ~7 gal (6 casing vols). Water silty, milky brown (Turb > 1000 NTU)

1740 Off-site. Continues developing 2006FS-MW-1 tomorrow

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	See pg 1	Technician Name (print): Mark Wenck

QA/QC'd by: **QA/QC Date:** 9/21/2018

OTIE
An Oneida ESC Group Company

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	1992FS, 2006FS, FT021
Technician Name:	Mark Wanek	**Date and Time:**	9-21-2018; 0800
Personnel Onsite:	M. Wanek + R. Ofili		
Weather Conditions:	cool, cloudy am → warm, sunny pm		

Description of Daily Activities and Events:

0800: Arrive at FT021 Laydown area. Set up to finish developing 2006FS-MW-1
Conduct tailgate H&S mtg and review PTAS SOP checklist.
Calibrate smartTroll and RDO cap is not working - reads 0.0. Called tech support to see how to repair. No repair possible - going to switch out with OTIE-owned Troll, brought up by Todd at site SA545
0930 Pick up SmartTroll from Todd. Mob to 2006FS-MW-1. Calibrate eq't.
1100 Begin developing (with pump) 2006FS-MW-1.
1210 2006FS-MW-1 slow recharge well. Pumped ~8 gal before well dry. Wait for recharge and mob to 1992FS.

List Samples Collected:

- 21-MW-1
- DUP-FT021-1
- 1992FS-MW1
- 1992FS-MW2
- EQB8-092118

Deviation from Plans:

None

Visitors on Site:	**Important Telephone Calls / Photos Taken:**	**Technician Signature:**
None	• Called tech support at FEI to see if RDO cap can be repaired ~~Hook~~ MW in the field. Answer: No. Called Todd Penniman and swapped out w/ OTIE-owned eq't.	[signature]
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/28/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-21-18	**Investigation Area:**	2006FS / 1992FS

Description of Daily Activities and Events:

1315 Begin sampling 1992FS-MW-1

1415 Collect gas sample from 1992FS-MW-1. Mob to 1992FS-MW-2

1450 Begin purging 1992FS-MW-2. Water drawing down even at lowest pump setting.

1504 Water below top of pump. Cease purging and wait for recharge to sample. Mob to FT021.

1556 Begin purge 21-MW1. Turbidity high - milky

1708 Achieve stability and sample 21-MW1. Transport H_2O to Jacobs lab at FT021

1815 Mob to 1992FS to check water level in 1992FS-MW-2. Water level at 28.72. Collected sample w/ SS bailer. Collect Eq'blank

1835 off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	See pg 1	Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/28/2018

OTIE

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	Base-wide / Project-wide
Technician Name:	MARK WANEK	**Date and Time:**	09-24-2018; 0710
Personnel Onsite:	OTIE: M. Wanek + R. Ofili; ECG: Scott PATTEN; S/G: T. Blakeley, N. Dunn, N. Navarro		
Weather Conditions:	Cool, cloudy/foggy a.m (55°F) → sunny p.m		

Description of Daily Activities and Events:

0700: Arrive at Visitor's Ctr. Meet w/ Rachel (OTIE); ~~EC~~ mw Scott Patten (ECG)
0710: Conduct tailgate H; S meeting; go over survey scope.
0730: Mob to 2006 Fuel spill site; meet drillers. Conduct daily tailgate H; S mtg and review daily SOP PFAS checklist. Check well 2006FS-MW-2 for presence of water. None. Will drill to TD = 37' with center rod system, ~~At~~ mw then switch ~~of~~ mw over to core barrel continuous corg system
0935 Reach TD = 37, begin continuously corg.
1035 Visit by Caltrans* from
1115 Encounter gw ~63.5' bgs.
1117 Collect replacement soil sample 2006FS-B2-63'. Let augers sit open

List Samples Collected:

- 2006FS-B2-63
- 2006FS-COMP-63
- EQB9-092428

Deviation from Plans:

None

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
CalTrans Maintenance * Caltrans Maintenance crew come by site 2006FS to ask about what we were doing and if we had a permit. I explained we were working on Air Force property and had an Air Force permit.	None	M
		Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/28/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9/24/18	**Investigation Area:**	Project-wide

Description of Daily Activities and Events:

for ~10 minutes. Measure H_2O inside auger @ 70.7' bgs.

1145 Note fine-grained unit at 68-71' in next core, ~~[illegible]~~ underlain by wet sandy material. Ondrill to 74' and set temp well in case water mostly coming from sandy zone and to complete well 8' below first encountered water

1200 Set well screened ~64'-74' bgs (see attached well diagram)

1400 Finish setting well 2006FS-MW-2.

1410 Measure DTW @ 64.28' bgs.

1445. Drill crew Mob to Laydown area to stage drums (3 soil) to pallets. Rachel finished with surveyor for the day. Completed survey of 1992FS, FT021, and SNTA. Complete survey tomorrow.

1515 Mob to storage area to stage eq't.

1600 Off site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
See pg. 1	None	Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/28/2018

OTIE

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	2006 FS, 1992 FS, 2009 AFFF Rel
Technician Name:	MARK WANEK	**Date and Time:**	09-25-2018, 0650

Personnel Onsite: OTIE: R. Ofili, M. Wanek ECG: SCOTT PATTEN

Weather Conditions: cool, foggy am (52°F) → warm, sunny pm (68°F)

Description of Daily Activities and Events:

0650 Arrive at Visitor's Center. Meet w/ Scott Patten of ECG. Conduct daily tailgate H&S mtg. but set up to begin surveying.

0750 Mob to Sta. Lucia Rd (2006 Fuel Spill Area). Review Daily PFAS SOP checklist. Take special precautions for crossing NB connector from Hwy 1 to Sta. Lucia Rd (position spotter in open lot N of road to observe for oncoming traffic, due to the presence of a blind corner crossing from S to N).

0920. Mob to Airfield Ops to notify they we will be at Ramp behind H1735. Received okay to proceed.

0945 Mob to 2009 AFFF Release area. Conduct flightline safety briefing and

List Samples Collected:

- 1992 FS - MW3
- EQB10 - 09252018

Deviation from Plans:

None

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	None	[signature]
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/28/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-25-2018	**Investigation Area:**	2006FS 1992FS 2009 AFFF RA

Description of Daily Activities and Events: (cont'd from pg 1)

compliance measures w/ ECG. Perform FOD check and transfer eq't to OTIE vehicle to drive on flight line

1020 Survey 2009 AFFF Release Area (2009 AFFF-B-1 and B-2).

1115 Complete Survey. ECG Departs site to OTIE Mob to 1992 FS area. Calibrate equipment and set up on 1992-MW-3.

1255 Begin purging 1992FS-MW-3

1745 Collect gw sample 1992F-MW3 after achieving stabilization. Mob to staging area to prep samples for shipping

1600 Rachel proceeds to FedEx to ship samples. MW to 2006FS to begin development of 2006FS-MW-2. Surge & bail after measuring DTW & TD. Note that well recharges well.

1700 Deploy pump and begin purging at 1 gpm. Dewater well to 72'. Lower pump rate to 0.3 gpm - well sustains equilibration at this rate or slightly lower. Purge ~21 gal before well clears up. Achieve stable parameters; turb < 50 NTU.

1800 Cease development. Transport water to FT021 Laydown.

1820 off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	None	[signature]
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/28/2018

OTIE

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 – 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	2006 Fuel Spill
Technician Name:	MARK WANEK	**Date and Time:**	26 SEPT 2018; 0800
Personnel Onsite:	M. Wanek + R. Ofsi		
Weather Conditions:	Cool, foggy am (55°F) → warm, sunny pm (71°F)		

Description of Daily Activities and Events:

0730: Arrive on-site. Received phone call from driller (Tim - S/G), that they had new crew member at pass; ID office to obtain badge

0740: Receive call from driller (Tim - S/G) that new crewmember could not obtain base pass, and no other helpers were available. Will begin abandonments tomorrow instead, when helpers are available. Conduct tailgate H&S meeting w/ tech and ~~rev~~ review daily PFAS SOP checklist. Set up to sample gw from 2006 FS.

0800 Load up eq't from store room, calibrate instruments

10:00-10:30 Lunch break

List Samples Collected:

- 2006 FS-MW1
- DUP-2006FS-1
- 2006FS-MW2 (MS/MSD)
- EQBK-092618

Deviation from Plans:

None

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	• Call from driller (Tim) that helper unable to get base pass and would have to start tomorrow and continue to Friday, as necessary • Call to Jennifer Hartling (OTIE PM) to notify that well abandonment would occur Thurs-Fri instead of Weds-Thurs.	[signature]
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/28/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	26 SEPT 2018	**Investigation Area:**	2006 FUEL SPILL

Description of Daily Activities and Events: (cont'd from pg 1)

10:30: Mob to 2006FS, ~~Set up on~~ MW via store room to get bottleware and coolers + ice

1145: Set up on 2006FS-MW-1. Tag DTW = 66.40' and TD = 73.5' btoc ≅ bgs.

1205: Begin purging 2006FS-MW-1, Water drawing down quickly at lowest pump rate.

1235: Well purged dry at lowest pump setting (0.1 gpm). Remove eq't and mob to 2006FS-MW-2.

1330: Begin purging 2006FS-MW-2.

~~1420~~ 1415: Turbidity drops to <50 NTU after 45 min and ~10 gal of purging, but turb begins to rise again

1430: Purged well for 1 hr and 8 casing volumes, parameters not yet stabilized. Collected gw sample per SOP

~~1510~~ 1440: Collect gw sample 2006FS-MW2, including extra bottles for MS/MSD. Mob back to 2006FS-MW-1. DTW = 67.27' btoc.

1515: Collect gw sample 2006FSMW1 and duplicate "DUP-2006FS-1" Decon eq't and collect Equipment blank "EQBH-092618" on decontaminated pump.

1600: Demob from 2006FS to eq't room to put away gw sampling eq't

1640: off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	See pg 1	M —
		Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 9/28/2018

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FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 - 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	FT021; 1992 FS
Technician Name:	Mark Wanek	**Date and Time:**	27 SEPT 2018; 0730
Personnel Onsite:	OTIE: M. Wanek S/G: T. Blakeslee, S. Duker		
Weather Conditions:	Foggy, Cool am (55°F) → warm, sunny pm (71°F)		

Description of Daily Activities and Events:

0730: Arrive at FT021. ~~Conf~~ Meet w/ S/G Drilling crew Tim & Sean. Conduct tailgate H&S mtg and review daily PFAS SOP checklist.

0815: Set up on well 21-MW-1. Must overdrill since seal is at surface.

0940: Complete overdrill & grout of 21-MW-1. V_{boring} = 37 gal; V_{grout} = 40 gal

0950: Mob to SNTM to take on water and top off divots in settled grout at 2 borings

1035: Mob to 1992 Fuel Spill Area (Main Gate). Set up on 1992FS-MW-1. TD = ~~24'~~ 26'

V_{boring} = 37 gal; ~~[illegible]~~

1145: Complete grouting of 1992FS-MW-1. V_{grout} = 68 gal

1150-1220: Lunch

List Samples Collected:

None

Deviation from Plans:

None

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	None	[signature]
		Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/28/2018

FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	27 Sept 2018	**Investigation Area:**	1992 FS ~~FT021~~

Description of Daily Activities and Events: (cont'd from pg 1)

1220: Mob to 1992 FS-MW-2. Measure TD = 35'. V_{Bring} = 91 gal

1320: Complete grouting 1992FS-MW-2. V_{grout} = 95 gal. Mob to 1992FS-MW-3. Measure TD = 33.5. ⇒ V_{Bring} = 87 gal

1420: Finish grouting 1992FS-MW-3. V_{Grout} = 90 gal

Mob rig and 1 drum of soil back to ~~FT20~~ FT021 Laydown Area to stage. Will complete 2006 Fuel Spill Area well abandonment tomorrow

1520: off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	None	
		Technician Name (print): Mark Winek

QA/QC'd by: **QA/QC Date:** 9/28/2018

OTIE
An Oneida ESC Group Company

FIELD ACTIVITY DAILY LOG

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186 -07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Investigation Area:**	FT021, 2006 FS
Technician Name:	M. Wanek	**Date and Time:**	9-28-2018; 0740
Personnel Onsite:	M. Wanek, T. Blakeborg, S. Duhes		
Weather Conditions:	cool, foggy am (55°F) → warm, sunny pm (65°F)		

Description of Daily Activities and Events:

0730 Arrive at FT021 laydown area

0740 Conduct tailgate H&S meeting & review Daily PFAS checklist. Mob to 2006 Fuel Spill area

0835 Set up on 2006FS-MW-1 Tag TD = 73.5; V_{Bring} = 192 gal

1030 Complete grouting 2006FS-MW-1 w/ 220 gal of grout. Mob to 2006-MW-2; Measure TD ≈ 74' ⇒ V_{Bring} = 193 gal.

1050 Begin grouting 2006-MW-2 using casing/screen as tremie (same as other)

1215 ~~1245~~ ~~Lunch~~ Complete grouting 2006-MW-2 w/ 220 gal grout

1215-1245 Lunch

1245 MH to FT021

List Samples Collected:

- IDW Water - FT021
- IDW Water - SNTA
- IDW Water - 2009AFFF
- IDW Water - 1992FS
- IDW Water - 2006FS
- IDW Soil - FT021
- IDW Soil - SNTA
- IDW Soil - 2009AFFF
- IDW Soil - 1992FS
- IDW Soil - 2006FS

Deviation from Plans:

None

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	None	Mark W.
		Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 10/11/2018

Continued on back

APPENDIX B-2

DAILY PFAS PROTOCOL CHECKLISTS

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FIELD ACTIVITY DAILY LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Date:	9-28-18	**Investigation Area:**	FZ021 2006 FS

Description of Daily Activities and Events: (cont'd from pg 1)

1310 Finish staging drums on pallets and cleaning up area to de-mob.

1345 Drillers off-site. Collect IDW composite samples (1 soil and 1 water composite from each of 5 sites)

1615 Return to storage room to load eq't & de-mob

1630 off-site

Visitors on Site:	Important Telephone Calls / Photos Taken:	Technician Signature:
None	None	Technician Name (print): Mark Wanek

QA/QC'd by: **QA/QC Date:** 10/11/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	foggy, cool (55° F)
Site Name:	FT021		
Field Manager:	Mark Wanek	**Date and Time:**	9-10-18 ; 0800

Field Clothing and PPE (as applicable):

- ☑ Field crew in compliance with Tables 1 and 2, SOP AFW-01
- ☑ Field crew has not used fabric softener on clothing
- ☑ Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- ☑ Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- ☑ No Teflon® containing materials on-site
- ☑ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- ☑ No waterproof field books on-site other than Rite-in-the-Rain® Products
- ☑ No plastic clipboards, binders, or spiral hard cover notebooks on-site
- ☑ No adhesives (Post-it® Notes) on-site
- ☑ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- ☑ All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- ☑ Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable): N/A

- ☑ For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only (in case of rain)

Equipment Decontamination:

- ☑ ~~"PFC-free"~~ PFAS-free water on-site for decontamination of sample equipment
- ☑ Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- ☑ No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

N/A

Field Manager Signature:

Field Manager Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/12/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG	**Weather (temp./precipitation):**	Foggy, Cool
Site Name:	FT021		
Field Manager:	Mark Wanek	**Date and Time:**	9-11-2018; 0715

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [x] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] ~~"PFC-free"~~ PFAS- water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature:

Field Manager Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/12/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Weather (temp./precipitation):**	cool, foggy (57°F)
Site Name:	SNTA/FT021/2009 AFFF Release		
Field Manager:	Mark Wanek	**Date and Time:**	09-12-2018; 0800

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [x] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only (N/A)

Equipment Decontamination:

- [x] "PFC-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature: [signature]

Field Manager Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9-17-2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	foggy, cool → 58°F
Site Name:	SNTA		
Field Manager:	Mark Wanek	**Date and Time:**	9-13-18 ; 0745

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [x] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only (N/A)

Equipment Decontamination:

- [x] "~~PFC~~ PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature: M. W.

Field Manager Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Weather (temp./precipitation):**	Foggy, cool am (57°F) → warm, sunny pm (74°F)
Site Name:	2006 Fuel Spill		
Field Manager:	M. Wanek	**Date and Time:**	9-14-2018 ; 0750

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [x] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only (N/A)

Equipment Decontamination:

- [x] "~~PFC~~ PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature: [signature]

Field Manager Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/17/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	56° F, foggy
Site Name:	1992 Fuel Spill		
Field Manager:	Mark Wanek	**Date and Time:**	09-17-2018; 0710

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [x] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] ~~"PFC-~~PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

NONE

Field Manager Signature: [signature]

Field Manager Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/20/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	(55°F) Cool am → warm pm
Site Name:	1992 Fuel Spill		
Field Manager:	Mark Wanek	**Date and Time:**	18 Sept 2018 ; 0730

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [x] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] ~~"PFC-free"~~ PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature: [signature]

Field Manager Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/20/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY ~~PFC~~ PFAS PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	Cool am (55°F) → breezy, cool pm (65°F)
Site Name:	2006 FS / FT021		
Field Manager:	M. Wanek	**Date and Time:**	9-19-2018; 0645

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] "~~PFC~~ PFAS free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature: Mark W

Field Manager Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/21/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Weather (temp./precipitation):**	Sunny cool am (61°F) → warm pm (81°F)
Site Name:	1992 FS / 2006 FS		
Field Manager:	Mark Wanek	**Date and Time:**	09-20-2018 ; 0730

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers: N/A *No samples collected on this date

- [ ] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [ ] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] ~~"PFC-free"~~ PFAS-free water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature:

Field Manager Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/21/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- c7
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	Cool am (~58°F), warm PM (71°F)
Site Name:	2006 FS, 1992 FS, FT021		
Field Manager:	Mark Wanek	**Date and Time:**	9-21-2018 ; 0800

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A - no rain

Equipment Decontamination:

- [x] ~~"PFC-free"~~ PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature:

Field Manager Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/28/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY ~~PFC~~ PFAS PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	Cool am (55°F) →
Site Name:	2006 Fuel Spill / 1992 Fuel Spill		
Field Manager:	Mark Wanek	**Date and Time:**	09-24-2018 ; 0730

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] "~~PFC~~ PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature: Mark W

Field Manager Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/28/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY ~~PFC~~ PFAS PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	Cool / foggy am (55°F), cool pm (65°F)
Site Name:	1992 FS / 2006 FS		
Field Manager:	Mark Wanek	**Date and Time:**	09-25-2018 ; 0800

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] "~~PFC~~ PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature:

Field Manager Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/25/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	Cool/foggy am (55°F)
Site Name:	2006 Fuel Spill		
Field Manager:	M. Wanek	**Date and Time:**	09-26-18 ; 0800

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] ~~"PFC~~ PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

None

Field Manager Signature:

Field Manager Name (print): MARK WANEK

QA/QC'd by:

QA/QC Date: 9/28/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	FT021, 1992 FS	**Weather (temp./precipitation):**	Cool, foggy am (55°F)
Site Name:	Vandenberg AFB		
Field Manager:	Mark Wanek	**Date and Time:**	27 Sept 2018; 0800

Field Clothing and PPE (as applicable):

- ☑ Field crew in compliance with Tables 1 and 2, SOP AFW-01
- ☑ Field crew has not used fabric softener on clothing
- ☑ Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- ☑ Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- ☑ No Teflon® containing materials on-site
- ☐ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene N/A
- ☑ No waterproof field books on-site other than Rite-in-the-Rain® Products
- ☑ No plastic clipboards, binders, or spiral hard cover notebooks on-site
- ☑ No adhesives (Post-it® Notes) on-site
- ☑ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- ☐ All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE N/A
- ☐ Caps are lined or unlined and made of HDPE or polypropylene N/A

Wet Weather (as applicable):

- ☐ For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- ☐ "PFC-free" water on-site for decontamination of sample equipment N/A
- ☑ Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- ☑ No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

*No sampling conducted on this date.

None

Field Manager Signature: [signature]

Field Manager Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/28/2018

ATTACHMENT 1 TO SOP AFW-01
DAILY PFC PROTOCOL CHECKLIST

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Weather (temp./precipitation):**	Cool/foggy (55°F)
Site Name:	~~VAND~~ 2006 Fuel Spill		
Field Manager:	Mark Wanek	**Date and Time:**	9-28-2018; 0740

Field Clothing and PPE (as applicable):

- [x] Field crew in compliance with Tables 1 and 2, SOP AFW-01
- [x] Field crew has not used fabric softener on clothing
- [x] Field crew has not used cosmetics, moisturizers, hand cream, or other related products or exposed body parts this morning
- [x] Field crew has not applied unacceptable sunscreen or insect repellant

Field Equipment:

- [x] No Teflon® containing materials on-site
- [x] All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- [x] No waterproof field books on-site other than Rite-in-the-Rain® Products
- [x] No plastic clipboards, binders, or spiral hard cover notebooks on-site
- [x] No adhesives (Post-it® Notes) on-site
- [x] Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- [x] All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- [x] Caps are lined or unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- [ ] For personnel in direct contact with samples and/or sampling equipment, wet weather gear made of Vinyl, polyurethane, PVC, latex or rubber-coated materials only N/A

Equipment Decontamination:

- [x] "~~PFC~~ PFAS-free" water on-site for decontamination of sample equipment
- [x] Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- [x] No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the investigation area or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the investigation area.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:
* No sampling conducted on this date.

None

Field Manager Signature: Mark Wanek

Field Manager Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 10/11/2018

APPENDIX B-3

TAILGATE SAFETY MEETING REPORTS

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TAILGATE SAFETY MEETING REPORT

OTIE

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG	**Date and Time:**	9-10-2018 0800
Field Manager Name:	MARK WANEK	**Site Health and Safety Officer (HSO):**	Mark WANEK

Safety Meeting Type (circle one): (Initial Kickoff Safety Meeting) Regular/Daily Tailgate Safety Meeting Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [x] MW 9-12-18 Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences (N/A)
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
- [x] Physical Hazards and Controls (e.g., overhead utility lines)
- [x] Decontamination Procedures for Personnel and Equipment
- [x] General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- [x] Site/Regional Emergency Procedures (e.g. earthquake response, typhoon response, etc.)
- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Tower down while on-site
Action taken on previous suggestions:	N/A
Injuries/accidents/personnel changes since previous meeting:	N/A
Observations of unsafe work practices/conditions that have developed since previous meeting:	N/A
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	N/A
Other Safety Topics:	Loc'n of 1st Aid kit and operation of kill switches
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE				
Nathan Navarro	S/G Drilling				
Timothy Blakeslee	S/G Drilling				
Nicholas Dean	S/G Drilling				
Rachel Ofil	OTIE				

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO	

QA/QC'd by: QA/QC Date: 9/12/201

TAILGATE SAFETY MEETING REPORT

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Date and Time:**	09-11-2018, 0720
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting Regular/Daily Tailgate Safety Meeting Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and ~~Personal Monitoring~~
- [ ] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [x] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
- [x] Physical Hazards and Controls (e.g., overhead utility lines)
- [x] Decontamination Procedures for Personnel and Equipment
- [x] General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- [x] Site/Regional Emergency Procedures (e.g. earthquake response, typhoon response, etc.)
- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Alert driller before entering work area
Action taken on previous suggestions:	N/A
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	None
Other Safety Topics:	Slip trip fall
Additional comments:	~~Slip trip fall~~ None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE	[signature]			
Rachel Ofili	OTIE	[signature]			
Nicholas Dean	SG/Drilling	[signature]			
Nate Nevarez	SG Drilling	[signature]			
Timothy Blakeley	S/G Drilling	[signature]			
Oscar Martinez	OTIE	[signature]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO	[signature]

QA/QC'd by: [signature] **QA/QC Date:** 9/12/2018

TAILGATE SAFETY MEETING REPORT

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg	**Date and Time:**	09-12-2018; 0800
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting — Regular/Daily Tailgate Safety Meeting — Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [ ] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [ ] Training Requirements
- [x] Safe Work Practices
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- [ ] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
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- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
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- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e g , Hearing Conservation Program, Safe Driving, etc)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Tire checks, permit on dashboard, flashlight on
Action taken on previous suggestions:	Increased housekeeping
Injuries/accidents/personnel changes since previous meeting:	N/A
Observations of unsafe work practices/conditions that have developed since previous meeting:	N/A
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	N/A
Other Safety Topics:	Flightline protocols; safe practices
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE				
Rachel Ofili	OTIE				
Timothy Blakeley	S/G Drilling				
Nicholas Dean	S/G Drilling				
Nate Navarro	S/G Drilling				
Juan Martinez	OTIE				

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO	

QA/QC'd by: QA/QC Date: 9/17/2018

TAILGATE SAFETY MEETING REPORT

OTIE

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date and Time:**	9-13-2018 ; 0745
Field Manager Name:	Mark Wenek	**Site Health and Safety Officer (HSO):**	Mark Wenek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting | Regular/Daily Tailgate Safety Meeting | Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [x] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences *
- [x] Engineering Controls
- [x] PPE Required/PPE Used
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- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers: Spot Worker on lift gate moving drum by standing behind

Action taken on previous suggestions: Assigned 2nd worker to Stand behind person moving drum w/ dolly on lift gate into stakebed

Injuries/accidents/personnel changes since previous meeting: None

Observations of unsafe work practices/conditions that have developed since previous meeting: None

Location of (or changes in the locations of) evacuation routes/safe refuge areas: None

Other Safety Topics: * Nearly tripped on unprotected piece of rebar in parking area yesterday while walking to truck. Covered rebar w/ cone so no one could trip on it.

Additional comments:

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wenek	OTIE	M. W.			
Rachel Ofili	OTIE	Rachel Ofili			
Timothy Blakeborough	S/G Drilling	[illegible]			
Nicholas Doan	S/G Drilling	[illegible]			
Nate Navarro	S/G Drilling	[illegible]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wenek	OTIE SSHO / FTL	Mark W.

QA/QC'd by: [illegible] QA/QC Date: 9/17/2018

TAILGATE SAFETY MEETING REPORT

OTIE

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date and Time:**	9-14-2018, 0800
Field Manager Name:	M. Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting Regular/Daily Tailgate Safety Meeting Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [ ] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [ ] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
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- [x] General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
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- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safely suggestions by site workers:	Be Care walking on sloped surface. chocks wheels auger
Action taken on previous suggestions:	N/A
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	None
Other Safety Topics:	Traffic Safety
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE				
Nicholas Doon	SG Drilling				
Nate Navarro	S/G Drilling				
Timothy Blakeley	S/G Drilling				
Rachel Ofili	S/G Drilling				

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO/FTL	

QA/QC'd by: **QA/QC Date:** 9/17/2018

TAILGATE SAFETY MEETING REPORT

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date and Time:**	09-17-2018, 0710
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting | Regular/Daily Tailgate Safety Meeting | Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [ ] Define PPE Levels, Donning, Doffing Procedures
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- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Watch for holes made by ground squirrels
Action taken on previous suggestions:	N/A
Injuries/accidents/personnel changes since previous meeting:	N/A
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	None
Other Safety Topics:	Extra work zone delineation to prevent public incursion
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE				
Nicholas Dea	S GD Drilling				
Timothy Blakely	S/G Drilling				
Nate Navarro	S/G Drilling				
Rachel Ofili	OTIE				

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO/FTL	

QA/QC'd by: **QA/QC Date:** 9/20/2018

TAILGATE SAFETY MEETING REPORT

OTIE

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date and Time:**	18 SEPT 2018, 0730
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting | Regular/Daily Tailgate Safety Meeting | Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [ ] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A

- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
- [x] Physical Hazards and Controls (e.g., overhead utility lines)
- [ ] Decontamination Procedures for Personnel and Equipment
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- [ ] Site/Regional Emergency Procedures (e.g. earthquake response, typhoon response, etc.)
- [ ] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Place buckets or other demarcation (cones, e.g.) over gopher/squirrel burrows in work area
Action taken on previous suggestions:	None
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	None
Other Safety Topics:	Extra delineation of work area to keep people from entering work zone while taking photos of visitor signs at Main Gate
Additional comments:	

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE	[signature]			
Nate Nowcort	S/G Drilling	[signature]			
Timothy Blalock	OS/G Drilling	[signature]			
Rachel Ofili	OTIE	[signature]			
Nicholas Doan	OSG Drilling	[signature]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE FTL / SSHO	[signature]

QA/QC'd by: [signature] **QA/QC Date:** 9/20/2018

TAILGATE SAFETY MEETING REPORT

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Date and Time:**	09-19-2018 ; 0645
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting | Regular/Daily Tailgate Safety Meeting | Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A
- [x] Engineering Controls
- [x] PPE Required/PPE Used
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- [x] Physical Hazards and Controls (e g., overhead utility lines)
- [x] Decontamination Procedures for Personnel and Equipment
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- [x] Site/Regional Emergency Procedures (e g earthquake response, typhoon response, etc.)
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- [x] Applicable SOPs (e g , Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Wear heavy leather gloves during drum handling to avoid pinch points
Action taken on previous suggestions:	N/A
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	None
Other Safety Topics:	N/A
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE	[signature]			
Timothy Blakeley	S/G Drilling	[signature]			
Nicholas Dean	S/G Drilling	[signature]			
Rachel Ofili	OTIE	[signature]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO/FTL	[signature]

QA/QC'd by: [signature] **QA/QC Date:** 9/21/2018

TAILGATE SAFETY MEETING REPORT

OTIE

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	20161860 7
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date and Time:**	9-20-18 ; 0730
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting | Regular/Daily Tailgate Safety Meeting | Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [ ] Medical Surveillance Requirements
- [ ] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
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- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A
- [x] Engineering Controls
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- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Take extra care around pallets for biological hazards
Action taken on previous suggestions:	filled ground burrows in work area
Injuries/accidents/personnel changes since previous meeting:	None (N/A)
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	Evac Area for 1992 FS is main parking lot
Other Safety Topics:	None
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE	[signature]			
Rachel Ofili	OTIE	[signature]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO / FTL	[signature]

QA/QC'd by: [signature] QA/QC Date: 9/20/2018

OTIE

TAILGATE SAFETY MEETING REPORT

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date and Time:**	9-21-18 - 0800
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting | Regular/Daily Tailgate Safety Meeting | Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
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- [x] Injury/Illiness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Raise work surface to avoid ergonomic hazards
Action taken on previous suggestions:	
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	open lot at FT021 Laydown Area
Other Safety Topics:	N/A
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE				
Rachel Ohli	OTIE				

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO/FTL	

QA/QC'd by: **QA/QC Date:** 9/28/2018

OTIE

TAILGATE SAFETY MEETING REPORT

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Date and Time:**	9.24.18; 0710
Field Manager Name:	MARK WANEK	**Site Health and Safety Officer (HSO):**	Mark

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting (Regular/Daily Tailgate Safety Meeting) Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
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- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
- [x] Physical Hazards and Controls (e.g., overhead utility lines)
- [x] Decontamination Procedures for Personnel and Equipment
- [x] General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- [ ] Site/Regional Emergency Procedures (e.g earthquake response, typhoon response, etc.)
- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [ ] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	~~Rai~~ new Keep an eye out for traffic
Action taken on previous suggestions:	Raised work site using plastic milk crate
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	Empty lot at intersection of Hwy 1 & Sta Lucia Rd
Other Safety Topics:	Don't get complacent – slow & steady & attn to quality
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE				
Rachel Chili	OTIE				
SCOTT PATTEN	EG&G				
Timothy Blakeley	S/G Drilling				
Nicholas Deon	S/G Drilling				
Nate Navarro	S/G Drilling				

Meeting Conducted By (print):	Company and Title	Signature
MARK WANEK	OTIE SSHO/FTL	

QA/QC'd by: QA/QC Date: 9/28/2018

TAILGATE SAFETY MEETING REPORT

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Date and Time:**	09-25-2018 ; 0650
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting | (Regular/Daily Tailgate Safety Meeting) | Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A

- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
- [x] Physical Hazards and Controls (e.g., overhead utility lines)
- [x] Decontamination Procedures for Personnel and Equipment
- [x] General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- [x] Site/Regional Emergency Procedures (e.g. earthquake response, typhoon response, etc.)
- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Keep an eye out for traffic. Have a spotter when crossing NB connector from Hwy 1 to Ste Lucia Rd.
Action taken on previous suggestions:	
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	Empty dirt lot on N Side of Ste Lucia Rd.
Other Safety Topics:	None
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE	[signature]			
Rachel Ofili	OTIE	[signature]			
SCOTT PATTEN	OCG	[signature]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO/FTL	[signature]

QA/QC'd by: [signature] QA/QC Date: 9/28/2018

TAILGATE SAFETY MEETING REPORT

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Date and Time:**	9.26.18 ; 0740
Field Manager Name:	Mark Wanek	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting — Regular/Daily Tailgate Safety Meeting — Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [ ] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
- [x] Physical Hazards and Controls (e.g., overhead utility lines)
- [x] Decontamination Procedures for Personnel and Equipment
- [x] General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- [x] Site/Regional Emergency Procedures (e.g. earthquake response, typhoon response, etc.)
- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Avoid pinch points when opening ; closing drum
Action taken on previous suggestions:	N/A
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	2086 FS : Empty lot N of Ste. Lucia Rd.
Other Safety Topics:	None
Additional comments:	None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE	[signature]			
Rachel Ofili	OTIE	[signature]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek [signature]	OTIE FTL/ SSHO	[signature]

QA/QC'd by: [signature] QA/QC Date: 9/28/2018

OTIE

TAILGATE SAFETY MEETING REPORT

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-18-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Date and Time:**	9-27-2018; 0730
Field Manager Name:	MARK WANEK	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting Regular/Daily Tailgate Safety Meeting Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [x] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
- [x] Physical Hazards and Controls (e.g., overhead utility lines)
- [x] Decontamination Procedures for Personnel and Equipment
- [x] General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- [x] Site/Regional Emergency Procedures (e.g. earthquake response, typhoon response, etc.)
- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Ensure Safety Chains are hooked up on rig
Action taken on previous suggestions:	360° walk around before engaging vehicle
Injuries/accidents/personnel changes since previous meeting:	~~None~~ NW Sean Dukes
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	Visitor ctr at 1992 FS
Other Safety Topics:	None
Additional comments:	— None —

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
Mark Wanek	OTIE	[signature]			
Timothy Blakely	S/G Drilling	[signature]			
Sean Dukes	S/G Drilling	[signature]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE SSHO/FTL	[signature]

QA/QC'd by: [signature] **QA/QC Date:** 9/28/2018

TAILGATE SAFETY MEETING REPORT

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Date and Time:**	9-28-18; 0740
Field Manager Name:	MARK WANEK	**Site Health and Safety Officer (HSO):**	Mark Wanek

Safety Meeting Type (circle one): Initial Kickoff Safety Meeting | Regular/Daily Tailgate Safety Meeting | Unscheduled Tailgate Safety Meeting

Order of Business

Topics Discussed (check all that apply):

- [x] Site History/Site Layout
- [x] Scope of Work
- [x] Personnel Responsibilities
- [x] Medical Surveillance Requirements
- [x] Training Requirements
- [x] Safe Work Practices
- [x] Logs, Reports, Recordkeeping
- [x] Sanitation and Illumination
- [x] Air Surveillance Type and Frequency
- [x] Monitoring Instruments and Personal Monitoring
- [x] Action Levels
- [x] Accident Reporting Procedures
- [x] Site Control (visitor access, buddy system, work zones, security, communications)
- [ ] Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences N/A
- [x] Engineering Controls
- [x] PPE Required/PPE Used
- [x] Define PPE Levels, Donning, Doffing Procedures
- [x] Physical Hazards and Controls (e.g., overhead utility lines)
- [x] Decontamination Procedures for Personnel and Equipment
- [x] General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- [x] Site/Regional Emergency Procedures (e.g. earthquake response, typhoon response, etc.)
- [x] Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- [x] Hazardous Materials Spill Procedures
- [x] Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- [x] Injury/Illness Reporting Procedures
- [x] Route to Hospital and Medical Care Provider Visit Guidelines
- [x] Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers:	Wear dust masks when handling cement bags
Action taken on previous suggestions:	Continue to ~~N/A~~ and Conduct 360° walkaround before moving vehicle
Injuries/accidents/personnel changes since previous meeting:	None
Observations of unsafe work practices/conditions that have developed since previous meeting:	None
Location of (or changes in the locations of) evacuation routes/safe refuge areas:	Empty lot N of Sta Lucia Rd (2006 FS)
Other Safety Topics:	Traffic Safety
Additional comments:	— None —

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Attendee Name (print)	Company	Signature	Attendee Name (print)	Company	Signature
MARK WANEK	OTIE	[signature]			
Timothy Blalock	S/G Drilling	[signature]			
Sean Dickes	S/G Drilling	[signature]			

Meeting Conducted By (print):	Company and Title	Signature
Mark Wanek	OTIE FTL/SSHO	[signature]

QA/QC'd by: [signature] QA/QC Date: 10/11/2018

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APPENDIX B-4

SOIL BORING/MONITORING WELL CONSTRUCTION RECORDS

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DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty SAND (SM). Dark yellowish-brown (10YR, 3/4). Moist, fine-grained, poorly graded. Loose (55% sand, 45% silt).		517.8	1992FS-B1-0.5				0
	- Becomes sandier (70% sand, 30% silt) and lighter dark yellowish brown (10YR, 4/6), fine- to medium-grained.							
5	- Becomes siltier (60% sand, 40% silt), very dark grayish brown (10YR, 3/2), fine-grained.		512.8					5
	- Becomes sandier (70% sand, 30% silt), dark yellowish brown (10YR, 4/6), fine- to medium-grained, weathered petroleum-like odor.					0.1		
	- Becomes gray (10YR, 6/1), fine-grained (65% sand, 35% silt).					0.0		
10	- Becomes light olive brown (2.5Y, 5/4).		507.8					10
	- Becomes sandier (75% sand, 25% silt), gray (2.5Y, 6/1).					0.0		
15			502.8					15
	POORLY GRADED SAND with trace silt (SP). Light yellowish brown (2.5Y, 6/3). Fine-grained. Loose. Wet. Subangular grains. (95% sand, 5% silt).			1992FS-B1-18				
20	Silty SAND (SM). Light olive brown (2.5Y, 5/4). fine-grained, poorly graded. Wet. Subangular grains. (60% sand, 40% silt).		497.8			0.1		20
	POORLY GRADED SAND with trace silt (SP). Light brownish gray (2.5Y, 6/2). Fine-grained. Loose. Wet. Subangular grains (95% sand, 5% silt)					0.0		
25			492.8					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/17/2018	TOC ELEVATION:	518.00 ft. amsl
END DATE:	9/17/2018	GROUND ELEVATION:	517.84 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2105172.43 ft.
METHOD:	Hollow Stem Auger	EASTING:	5804510.86 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 2		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

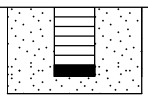
Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 1992FS-MW-1

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	Silty SAND (SM). Grayish-brown (2.5Y, 5/2). Medium dense. Moist. Poorly graded, fine-grained, subangular. (75% sand, 25% silt).		492.8					25
	Boring terminated at 26 feet bgs on 09/17/2018. Boring converted to temporary monitoring well 1992FS-MW-1. Groundwater encountered at 18.0 feet bgs on 09/17/2018.							
30			487.8					30
35			482.8					35
40			477.8					40
45			472.8					45
50			467.8					50

START DATE:	9/17/2018	TOC ELEVATION:	518.00 ft. amsl
END DATE:	9/17/2018	GROUND ELEVATION:	517.84 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2105172.43 ft.
METHOD:	Hollow Stem Auger	EASTING:	5804510.86 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 2		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 1992FS-MW-1

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty SAND (SM). Brown (7.5YR, 5/2). Fine-grained, poorly graded. Loose. Dry. Subangular. Organic material (60% sand, 40% silt).		514.5	1992FS-B2-0.5				0
	- Becomes siltier (55% sand, 45% silt). Brown (10YR, 4/3)					0.7		
	- Becomes sandier (60% sand, 40% silt). Light gray (10YR, 7/2)							
5			509.5					5
	- Becomes sandier (70% sand, 30% silt). Light olive brown (2.5Y, 5/6). Medium dense.					0.5		
	- Becoes light yellowish brown (2.5Y, 6/3).							
10			504.5					10
	- Becomes light olive brown (2.5Y, 5/3) with rust-colored oxidation/secondary mineralization					0.5		
	- Becomes mottled with dark gray and petroleum-like odor							
15	- Secondary mineralization/oxidation stringers throughout		499.5					15
	- Becomes siltier (60% sand, 40% silt). Yellowish brown (10YR, 5/6)					0.4		
	- Becomes sandier (75% sand, 25% silt). Light yellowish brown (2.5Y, 6/4)							
	- Orange secondary mineralization/oxidation stringers throughout							
20			494.5					20
	- Becomes sandier (80% sand, 20% silt). Pale yellow (2.5Y, 7/3)					0.2		
	- Beomes light yellowish brown (2.5Y, 6/4)							
						0.1		
25			489.5					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/17/2018	TOC ELEVATION:	515.13 ft. amsl
END DATE:	9/18/2018	GROUND ELEVATION:	514.48 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2105212.02 ft.
METHOD:	Hollow Stem Auger	EASTING:	5804476.71 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 2		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 1992FS-MW-2

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	Silty SAND (SM). Brown (7.5YR, 5/2). Fine-grained, poorly graded. Loose. Dry. Subangular. Organic material (60% sand, 40% silt).		489.5					25
	- Becomes siltier (65% sand, 35% silt). Light gray (10YR, 7/2). Wet at 28.5 ft			1992FS-B2-28				
30	Sandy SILT (ML). Dark yellowish brown (10YR, 4/6). Stiff. Non-plastic. Moist. Sand poorly graded, fine-grained. (40% sand, 60% silt).		484.5			0.1		30
	Silty SAND (SM). Light yellowish brown (2.5Y, 6/4). Moist. Medium dense. Poorly graded, fine-grained, subangular sand. (60% sand, 40% silt).					0.1		
35	Boring terminated at 35.0 ft bgs on 09/18/2018. Depth-to-water measured inside auger at 34.8 ft bgs on 9/17/2018. Boring converted to temporary monitoring well 1992FS-MW-2 on 09/18/2018.		479.5				Heaving sand encountered inside auger	35
40			474.5					40
45			469.5					45
50			464.5					50

START DATE:	9/17/2018	TOC ELEVATION:	515.13 ft. amsl
END DATE:	9/18/2018	GROUND ELEVATION:	514.48 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2105212.02 ft.
METHOD:	Hollow Stem Auger	EASTING:	5804476.71 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 2		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 1992FS-MW-2

OTIE An Oneida Nation Company

Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty SAND (SM). Dark yellowish brown (10YR, 3/4). Dry. Loose. Fine-grained, poorly graded. Subangular (55% sand, 45% silt).		512.6	1992FS-B3-0.5				0
	- Becomes sandier (80% sand, 20% silt). Very pale brown (10YR, 7/4). Medium dense.					0.1		
5	SILT with sand (ML). Very dark gray (10YR, 3/1). Stiff. Moist. Non-plastic (20% sand, 80% silt).		507.6			0.0		5
	Silty SAND (SM). Light brownish gray (10YR, 6/2). Medium dense. Moist. Fine-grained, poorly graded, subangular (70% sand, 30% silt). - Approximately 6 inches of rust-colored secondary mineralization/oxidation.							
10			502.6			0.0		10
	- Becomes dark grayish brown (10YR, 4/2), secondary mineralization (little uniform fine sand-sized particles). - Becomes siltier (60% sand, 40% silt), gray (10YR, 6/1). - Brownish yellow (10YR, 6/8) staining/oxidation throughout.							
15			497.6			0.1		15
	- Becomes light yellowish brown (2.5Y, 6/4), secondary mineralization (few uniform sand-sized particles). (65% sand, 35% silt).							
20	- Becomes sandier (75% sand, 25% silt).		492.6					20
	- Becomes light yellowish brown (2.5Y, 6/3). Loose to medium dense. - Becomes wet at 24.0 ft bgs.			1992FS-B3-23.5		0.1		
25			487.6					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/18/2018	TOC ELEVATION:	514.36 ft. amsl
END DATE:	9/18/2018	GROUND ELEVATION:	512.57 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2105175.12 ft.
METHOD:	Hollow Stem Auger	EASTING:	5804441.66 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 2		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

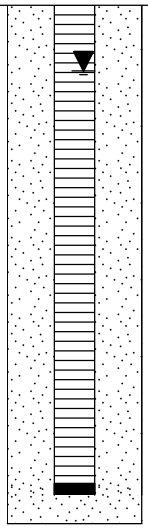
Checked By: J. Harting, PE

Well No. 1992FS-MW-3

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	Silty SAND (SM). Light brownish gray (10YR, 6/2). Medium dense. Moist. Fine-grained, poorly graded, subangular (70% sand, 30% silt).		487.6					25
30	POORLY GRADED SAND (SP). Pale yellow (2.5Y, 7/3). Fine-grained. Loose to medium dense. Wet. (95% sand, 5% silt).		482.6			0.0		30
35	Boring terminated at 33.5 ft bgs on 09/18/2018 and converted to temporary monitoring well 1992FS-MW-3. Groundwater encountered at 24.0 ft bgs on 09/18/2018.		477.6					35
40			472.6					40
45			467.6					45
50			462.6					50



START DATE:	9/18/2018	TOC ELEVATION:	514.36 ft. amsl
END DATE:	9/18/2018	GROUND ELEVATION:	512.57 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2105175.12 ft.
METHOD:	Hollow Stem Auger	EASTING:	5804441.66 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 2		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty GRAVEL with sand (GM). Yellowish brown (10YR, 5/4). Dry. Loose. Well-graded, fine-coarse sand. Gravel up to approx. 1/2" diameter (50% gravel, 25% sand, 25% silt).		229.9	2006AFFF-B1-0.5				0
	- Hand auger refusal at 2.5 ft bgs. Switched to HSA.					0.0		
	- Becomes very dark brown (10YR, 2/2). Medium dense.							
5	Silty SAND (SM). Yellowish brown (10YR, 5/6). Moist. Loose to medium dense. Fine-grained, poorly graded, subangular. (70% sand, 30% silt).		224.9					5
	- Becomes dark yellowish brown (10YR, 3/4)					0.0		
10	POORLY GRADED SAND (SP). Very pale brown (10YR, 7/4). Moist. Loose. Fine-grained, subangular. (95% sand, 5% silt).		219.9			0.1		10
						0.1		
15			214.9					15
20	POORLY GRADED SAND with silt (SP-SM). Brownish yellow (10YR, 6/6). Moist. Loose. Fine-grained, subangular. (90% sand, 10% silt).		209.9			0.2		20
25	POORLY GRADED SAND (SP). Pale yellow (2.5Y, 7/4). Moist. Loose. Fine-grained, subangular (95% sand, 5% silt), with secondary mineralization (rust-colored oxidation).		204.9					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/14/2018	TOC ELEVATION:	230.06 ft. amsl
END DATE:	9/18/2018	GROUND ELEVATION:	229.90 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2091194.54 ft.
METHOD:	Hollow Stem Auger	EASTING:	5813596.01 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 3		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 2006FS-MW-1

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	POORLY GRADED SAND (SP). Pale yellow (2.5Y, 7/4). Moist. Loose. Fine-grained, subangular (95% sand, 5% silt), with secondary mineralization (rust-colored oxidation).		204.9			0.2		25
30	POORLY GRADED SAND with silt (SP-SM). Olive yellow (2.5Y, 6/6). Moist. Loose. Fine-grained, subangular. (90% sand, 10% silt).		199.9			0.9		30
35	Sandy SILT (ML). Yellowish brown (10YR, 5/6). Moist. Stiff. Low plasticity, fine-grained, poorly graded sand (30% sand, 70% silt).		194.9					35
	- Becomes sandier (40% sand, 60% silt). Light olive brown (2.5Y, 5/3), non plastic.					0.9		
	Silty SAND (SM). Light olive brown (2.5Y, 5/3). Moist. Dense. Poorly graded, fine-grained, subangular (55% sand, 45% silt).							
40	- Becomes sandier (60% sand, 40% silt), olive brown (2.5Y, 4/4)		189.9					40
	- Becomes very moist 41.2 - 41.8 ft bgs. Brown (10YR, 5/3). Fine- to medium-grained.					0.8		
	Sandy SILT (ML). Grayish brown (2.5Y, 5/2) with fine-grained sand. Wet. Stiff. Non-plastic. (45% sand, 55% silt).							
	- Becomes silt with sand (15% sand, 85% silt). Light olive brown (2.5Y, 5/3).							
45	- Approximately 4 inches of rust-colored oxidation/secondary mineralization		184.9					45
	Silty SAND (SM). Light olive-brown (2.5Y, 6/4). Wet. Dense. Poorly graded, fine-grained. (55% sand, 45% silt).					0.5		
	Gravelly SILT with sand (ML). Yellowish brown (10YR, 5/4). Moist. Medium dense. Fine, subangular gravel. Fine to coarse grained well graded sands. (30% gravel, 20% sand, 50% silt).					0.6	Drilling stopped 09/14/2018 to wait for water. Resumed 09/18/2018 after	
50			179.9					50

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/14/2018	TOC ELEVATION:	230.06 ft. amsl
END DATE:	9/18/2018	GROUND ELEVATION:	229.90 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2091194.54 ft.
METHOD:	Hollow Stem Auger	EASTING:	5813596.01 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 3		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 2006FS-MW-1

OTIE An Oneida Nation Company
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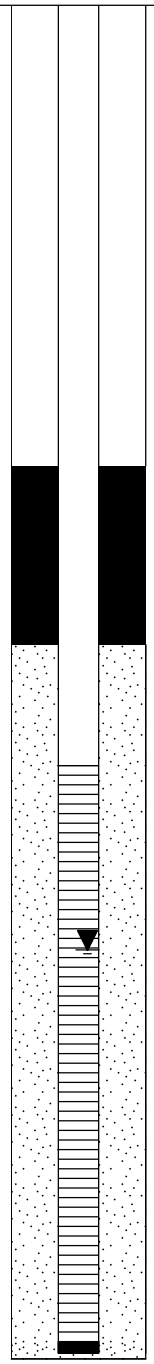
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
50	Silty SAND with gravel (SM). Light yellowish brown (10YR, 6/4). Moist. Loose. Fine to coarse grained sand, shell fragments. (20% gravel, 50% sand, 30% silt).		179.9				no water observed in boring.	50
55	Sandy SILT (ML). Yellowish brown (10YR, 5/4). Moist. Medium stiff. Non-plastic. Fine-grained, poorly graded subangular sand (35% sand, 65% silt). - Approximately 4 inches of rust-colored oxidation (secondary mineralization).		174.9			0.5		55
60	SIlty SAND (SM). Light yellowish brown (2.5Y, 6/4). Moist. Loose. Fine-grained, poorly graded, subangular. (65% sand, 35% silt).		169.9					60
	Sandy SILT (ML). Light olive brown (2.5Y, 5/3). Non plastic. Fine-grained, subangular sand (35% sand, 65% silt)					0.5		
65	Silty SAND with trace gravel (SM). Light yellowish brown (2.5Y, 6/3). Very moist. Medium dense. Fine-grained, poorly graded. Rounded gravel to 1/4" diameter. (5% gravel, 50% sand, 45% silt). - Becomes wet at 64.8 ft bgs.		164.9	2006AFFF-B1-64.3		0.4		65
70	Sandy SILT (ML). Light olive brown (2.5Y, 5/4). Moist. Medium stiff. Low plasticity, medium dilatancy. Abundant bioturbation.		159.9					70
	Silty SAND with little gravel (SM). Light yellowish brown (2.5Y, 6/4). Wet. Medium dense. Gravel rounded to subrounded to 3/4" diameter (10% gravel, 60% sand, 30% silt).					0.4		
	Sandy SILT with little gravel (ML). Light yellowish brown (2.5Y, 6/4). Moist. Medium stiff. Low to medium plasticity. (10% gravel, 35% sand, 55% silt).							
75			154.9					75



(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/14/2018	TOC ELEVATION:	230.06 ft. amsl
END DATE:	9/18/2018	GROUND ELEVATION:	229.90 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2091194.54 ft.
METHOD:	Hollow Stem Auger	EASTING:	5813596.01 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 3		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 2006FS-MW-1

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
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San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
75	Boring terminated at 73 ft. bgs on 09/18/2018 and converted to temporary monitoring well 2006FS-MW-1 on 09/18/2018. Groundwater encountered at 64.8 ft bgs.		154.9					75
80			149.9					80
85			144.9					85
90			139.9					90
95			134.9					95
100			129.9					100

START DATE:	9/14/2018	TOC ELEVATION:	230.06 ft. amsl
END DATE:	9/18/2018	GROUND ELEVATION:	229.90 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2091194.54 ft.
METHOD:	Hollow Stem Auger	EASTING:	5813596.01 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 3		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty GRAVEL with sand (GM). Brown (7.5YR, 4/2). Dry. Loose. Well graded, fine-coarse sand. Gravel to 1/2" diameter. (50% gravel, 20% sand, 30% silt).		227.3	2006FS-B2-0.5				0
	- Asphalt pieces to 1". Hand auger refusal. Begin advancing with HSA.					0.0		
	Silty SAND (SM). Dark yellowish-brown (10YR, 4/4). Moist. Loose. Fine-grained, poorly graded, subangular sand grains. (60% sand, 40% silt).							
5	POORLY GRADED SAND (SP). Yellowish brown (10YR, 5/4). Moist. Loose. Fine-grained, poorly graded, subangular (95% sand, 5% silt).		222.3					5
	Silty SAND (SM). Very dark brown (7.5YR, 2.5/2). Moist. Loose. Fine-grained, poorly graded, subangular. (70% sand, 30% silt).							
	POORLY GRADED SAND (SP). Very pale brown (10YR, 7/4). Moist. Loose. Fine-grained, poorly graded, subangular. (95% sand, 5% silt)							
10			217.3					10
15	Silty SAND (SM). Yellowish brown (10YR, 5/6). Moist. Loose. Fine-grained, poorly graded. (75% sand, 25% silt).		212.3			0.0		15
	- Becomes siltier (70% sand, 30% silt). Reddish-pink colored staining/secondary mineralization throughout							
20	- Approximately 3 inch layer of reddish pink-colored oxidation)		207.3			0.0		20
	POORLY GRADED SAND (SP). Olive yellow (2.5Y, 6/6). Moist. Loose. Fine-grained, poorly graded, subangular. (95% sand, 5% silt).							
25			202.3					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/14/2018	TOC ELEVATION:	227.54 ft. amsl
END DATE:	9/24/2018	GROUND ELEVATION:	227.27 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2091242.27 ft.
METHOD:	Hollow Stem Auger	EASTING:	5813609.52 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 3		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 2006FS-MW-2

OTIE An Oneida Nation Company
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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	- Becomes pale yellow (2.5Y, 7/4) POORLY GRADED SAND (SP). Olive yellow (2.5Y, 6/6). Moist. Loose. Fine-grained, poorly graded, subangular. (95% sand, 5% silt).		202.3			0.0		25
30	SILT with sand (ML). Brown (7.5YR, 4/3). Moist. Stiff. Fine-grained sand (20% sand, 80% silt).		197.3					30
	Silty SAND (SM). Brown (7.5YR, 4/3). Moist. Loose. Fine-grained, poorly graded, subangular. (55% sand, 45% silt).					0.1		
35	Sandy SILT (ML). Brown (10YR, 5/3). Wet. Medium stiff. Fine, subangular sand. Becomes wet at 33.1 ft. bgs. - Becomes sandier, grayish brown (10YR, 5/2). Moist. Stiff (30% sand, 70% silt).		192.3			0.0		35
	Silty SAND with gravel (SM). Dark yellowish brown (10YR, 4/4). Moist. Medium dense. (10% gravel, 50% sand, 40% silt).					0.3	Drilling stopped on 09/14/18 to allow time for water to come in. Drilling resumed on 09/21/2018 after no water observed.	
40	LEAN CLAY (CL) with trace gravel and sand. Olive brown (2.5Y, 4/3). Moist. Stiff. Medium plasticity. Slow dilatancy (5% gravel, 10% sand, 85% clay).		187.3			0.2		40
	Silty SAND with trace gravel (SM). Brownish yellow (10YR, 6/6). Moist. Medium dense. Fine-grained, poorly graded, subangular.					0.0 0.0		
45	POORLY GRADED SAND with trace silt and gravel (SP). Yellow (10YR, 7/6). Moist. Medium dense. Fine-grained, poorly graded, subrounded. Gravel subrounded to rounded to 1/2" diameter.		182.3			0.1 0.1		45
50			177.3					50

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/14/2018	TOC ELEVATION:	227.54 ft. amsl
END DATE:	9/24/2018	GROUND ELEVATION:	227.27 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2091242.27 ft.
METHOD:	Hollow Stem Auger	EASTING:	5813609.52 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 3		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 2006FS-MW-2

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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLE ID	TYPE	PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
50	POORLY GRADED SAND with trace silt and gravel (SP). Yellow (10YR, 7/6). Moist. Medium dense. Fine-grained, poorly graded, subrounded. Gravel subrounded to rounded to 1/2" diameter.		177.3			0.0		50
	- Becomes light yellowish brown (10YR, 6/4) at 50 ft. bgs.							
	Silty SAND (SM). Yellowish brown (10YR, 5/6). Moist. Medium dense to dense. (60% sand, 40% silt).					0.1		
55	Sandy SILT (ML). Yellowish brown (10YR, 5/4). Moist. Stiff. Low plasticity. Rapid dilatancy. Fine to medium sand grains (40% sand, 60% silt).		172.3			0.1		55
60			167.3			0.4		60
	Silty SAND (SM). Light brownish gray (10YR, 6/2). Moist. Dense. Fine-grained with occasional yellowish red oxidation (70% sand, 30% silt).			2006FS-B2-63		0.3		
	- Becomes wet at 63.6 ft. bgs., decreased silt (80% sand, 20% silt).							
65	Sandy SILT (ML). Dark yellowish brown (10YR, 4/4). Moist. Stiff. Low plasticity. Medium dilatancy. (25% sand, 75% silt).		162.3			0.2		65
	- Becomes sandier (30% sand, 70% silt).					0.2		
70			157.3					70
	Silty SAND (SM). Dark yellowish brown (10YR, 4/4). Wet. Dense. Abundant bioturbation and secondary mineralization (75% sand, 25% silt).					0.9		
	Boring terminated at 74 ft. bgs on 09/21/2018 and converted to temporary monitoring well 2006FS-MW-2.							
75			152.3					75

START DATE:	9/14/2018	TOC ELEVATION:	227.54 ft. amsl
END DATE:	9/24/2018	GROUND ELEVATION:	227.27 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2091242.27 ft.
METHOD:	Hollow Stem Auger	EASTING:	5813609.52 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 3		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 2006FS-MW-2

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty SAND (SM). Light brownish gray (10YR, 6/2). Dry. Loose. Fine-grained, poorly graded, subangular (65% sand, 35% silt).		351.7	2009AFFF-B1-0.5				0
	- Becomes sandier (75% sand, 25% silt), pale brown (10YR, 6/2).					0.5		
5	- Becomes moist, medium dense.		346.7					5
	- Becomes siltier (70% sand, 30% silt), gray (10YR, 5/1) with secondary mineralization (rust-colored oxidation).					0.3		
10	- Becomes sandier (80% sand, 20% silt), olive yellow (2.5Y, 6/6).		341.7					10
	- Becomes siltier (65% sand, 35% silt), light olive brown (2.5Y, 5/3).					0.2		
	- Becomes sandier (75% sand, 25% silt), light brownish gray (2.5Y, 6/2).					0.3		
15			336.7					15
						0.1		
20	- Becomes siltier (70% sand, 30% silt).		331.7					20
						0.0		
	- Becomes light gray (2.5Y, 7/2).					0.1		
25			326.7					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/12/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/12/2018	GROUND ELEVATION:	351.73 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2098886.81 ft.
METHOD:	Hollow Stem Auger	EASTING:	5790155.61 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 4		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. 2009AFFF-B-1

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	- Secondary mineralization (rust-colored oxidation) apparent, light staining.		326.7					25
	Silty SAND (SM). Light brownish gray (10YR, 6/2). Dry. Loose. Fine-grained, poorly graded, subangular (65% sand, 35% silt).					0.0		
	- Becomes coarse-grained, light yellowish brown (2.5Y, 6/4).					0.0		
30	- Becomes pale yellow (5Y, 7/4).		321.7					30
				2009AFFF-B1-31.5		0.2		
	Weathered BEDROCK (Monterey Formation). Light gray (2.5Y, 7/2). Friable, cherty, partially indurated. Fine-grained particles to 2" max diameter. Sharp contact at 31.9 ft. bgs. between native soil and weathered bedrock.							
35	Boring terminated at 34 ft. bgs on 09/12/2018 and backfilled with bentonite-cement grout. No groundwater encountered.		316.7					35
40			311.7					40
45			306.7					45
50			301.7					50

START DATE:	9/12/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/12/2018	GROUND ELEVATION:	351.73 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2098886.81 ft.
METHOD:	Hollow Stem Auger	EASTING:	5790155.61 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 4		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

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Boring No. 2009AFFF-B-1

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210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty SAND (SM). Brown (7.5YR, 4/2). Dry to moist. Loose. Fine-grained, poorly graded, subangular (60% sand, 40% silt). Some vegetation.		352.7	2009AFFF-B2-0.5				0
	- Becomes sandier (70% sand, 30% silt), brownish yellow (10YR, 6/6), moist. No vegetation/organic material.					0.1		
5	- Becomes sandier (75% sand, 25% silt), yellowish brown (10YR, 5/6). Medium dense.		347.7			0.0		5
	- Becomes siltier (60% sand, 40% silt). Pale brown (10YR, 6/3), loose.							
	- Becomes sandier (70% sand, 30% silt), grayish brown (10YR, 5/2), very moist, medium dense.							
10	- Becomes moist, rust-colored secondary mineralization (oxidation).		342.7					10
						0.0		
	- Becomes light brownish gray (2.5Y, 6/2).							
15			337.7					15
						0.0		
						0.1		
20			332.7					20
						0.0		
	- Becomes light yellowish brown (2.5Y, 6/3).							
25			327.7					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/12/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/12/2018	GROUND ELEVATION:	352.71 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2098791.3 ft.
METHOD:	Hollow Stem Auger	EASTING:	5790240.96 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 4		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. 2009AFFF-B-2

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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	Silty SAND (SM). Brown (7.5YR, 4/2). Dry to moist. Loose. Fine-grained, poorly graded, subangular (60% sand, 40% silt). Some vegetation.		327.7			0.2		25
	- Becomes siltier (65% sand, 35% silt), light yellowish brown (2.5Y, 6/4), fine- to medium-grained, loose to medium dense.							
30	- Becoms siltier (60% sand, 40% silt), brownish yellow (10YR, 6/8), fine-grained, medium dense.		322.7			0.2		30
				2009AFFF-B2-33.5				
35	Weathered BEDROCK (Monterey Formation). Pale brown (10YR, 6/3). Dry to moist. Friable, cherty. Angular particles to 3" diameter. Sharp contact at 34 ft. bgs.		317.7					35
	- Becomes strong brown (7.5YR, 5/8). Highly weathered, breaks up to medium- to coarse-grained particles.					0.2		
	- Becomes pinkish gray (7.5YR, 7/2).							
	- Becomes partially indurated, easily friable with iron staining (oxidation). Particles to 4" diameter.							
40			312.7			0.2		40
45	Boring terminated at 43.5 ft. bgs on 09/12/2018 and backfilled with cement-bentonite grout. No groundwater encountered.		307.7					45
50			302.7					50

START DATE:	9/12/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/12/2018	GROUND ELEVATION:	352.71 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2098791.3 ft.
METHOD:	Hollow Stem Auger	EASTING:	5790240.96 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 4		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. 2009AFFF-B-2

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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty SAND (SM). Brown (10YR, 5/3). Dry to moist. Medium dense. Well graded, fine- to coarse-grained (60% sand, 40% silt). (Backfill).		353.5					0
	- Becomes loose.					0.4		
	- Becomes medium dense to dense.							
5			348.5					5
	WELL GRADED SAND with gravel and trace silt (SW). Light olive brown (2.5Y, 5/3). Wet. Fine- to coarse-grained sand. Gravel to 1.5" diameter. (Backfill)							
				21-B27-8.5		0.5		
10			343.5					10
						0.9		
	POORLY GRADED SAND with silt (SP-SM). Gray (2.5Y, 6/1). Wet. Loose. Fine-grained. Sharp contact between backfill and native soil at 13.4 ft. bgs.							
15	- Orange secondary mineralization apparent.		338.5					15
	- Dark striations apparent.							
	- Very dark gray (7.5YR, 3/1) clay stringer at 16.5 ft. bgs.							
	Silty SAND (SM). Light brownish gray (2.5Y, 6/2) with orange secondary mineralization. Wet. Medium dense. (85% sand, 15% silt)					0.4		
20	- occasional very dark gray (7.5YR, 3/1) clay stringers approx. 1" thick.		333.5					20
	- Root casts apparent, moderate sulfide odor.							
	POORLY GRADED SAND with silt (SP-SM). Moist. Medium dense (90% sand, 10% silt).					0.5		
	Silty SAND (SM). Light olive brown (2.5Y, 5/6) with abundant oxidation. Wet. Medium dense. (70% sand, 30% silt).							
25			328.5					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/10/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/10/2018	GROUND ELEVATION:	353.54 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2094366.65 ft.
METHOD:	Hollow Stem Auger	EASTING:	5788675.39 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 1		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. 21-B-27

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	Silty SAND (SM). Light olive brown (2.5Y, 5/6) with abundant oxidation. Wet. Medium dense. (70% sand, 30% silt).		328.5					25
	- Becomes olive yellow (2.5Y, 6/6).					0.3		
30	- 2-inch lens of highly weathered bedrock, light yellowish brown (2.5Y, 6/3). Friable, cherty, gravel size to 2" diameter.		323.5					30
						0.4		
35	- Becomes moist, fine to coarse sand.		318.5					35
	Weathered BEDROCK (Monterey Formation). Light yellowish brown (2.5Y, 6/4). Wet. Dense. Friable, cherty. Angular rock fragments to 2.5 inches diameter.							
40			313.5					40
45	Boring terminated at 43 ft. bgs on 09/10/2018 and backfilled with bentonite-cement grout. Note: Groundwater encountered at approximately 6.5 ft. bgs. Boring advanced to bedrock with no well installed in accordance with the work plan.		308.5					45
50			303.5					50

START DATE:	9/10/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/10/2018	GROUND ELEVATION:	353.54 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2094366.65 ft.
METHOD:	Hollow Stem Auger	EASTING:	5788675.39 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 1		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. 21-B-27

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AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty SAND (SM). Light yellowish brown (10YR, 6/4). Dry. Loose. Fine-grained, poorly graded, subangular. (75% sand, 25% silt).		347.5	21-B28-0.5		0.0		0
	POORLY GRADED SAND with trace silt (SP). Very pale brown (10YR, 7/4). Dry. Loose. Fine-grained, subangular (95% sand, 5% silt).					0.2 0.3		
5	Silty SAND (SM). Dark grayish brown (10YR, 4/2). Moist. Dense. Fine-grained. Secondary mineralization apparent. Faint petroleum-like odor, light staining. Sharp contact at 4.5 ft. bgs. (70% sand, 30% silt).		342.5					5
	- Becomes grayish brown (10YR, 5/2), siltier (65% sand, 35% silt).					1.5		
10	- Secondary mineralization (rust-colored oxidation) stringers throughout		337.5					10
	Sandy SILT (ML). Dark gray (10YR, 4/1). Moist. Very stiff. Low plasticity. Faint petroleum-like odor. Sharp contact at 10.7 ft. bgs. (30% sand, 70% silt).					1.8		
	Silty SAND (SM). Pale brown (10YR, 6/3). Moist. Medium dense. FIne- to medium-grained, poorly graded, subangular. (65% sand, 35% silt).					1.9		
15	Sandy GRAVEL with silt (GM). Light brownish gray (10YR, 6/2). Moist. Loose. Well graded, fine- to coarse-grained sand, subangular. (55% gravel, 25% sand, 20% silt).		332.5					15
	Silty SAND (SM). Light brownish gray (10YR, 6/2). Moist. Medium dense. Fine-grained, poorly graded, subangular. (65% sand, 35% silt).					0.6		
20	Weathered BEDROCK (Monterey Formation). Light yellowish brown (2.5Y, 6/4). Moist. Dense. Partially indurated. Friable, cherty. Angular rock fragments to 1.5 inches diameter.		327.5	21-B28-19		0.9		20
	Boring terminated at 23 ft. bgs on 09/13/2018 and backfilled bentonite-cement grout. No groundwater encountered.							
25			322.5					25

START DATE:	9/13/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/13/2018	GROUND ELEVATION:	347.54 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2094717.34 ft.
METHOD:	Hollow Stem Auger	EASTING:	5788158.76 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 1		
LOGGED BY:	R. Ofili		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. 21-B-28

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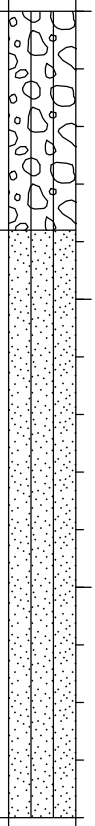
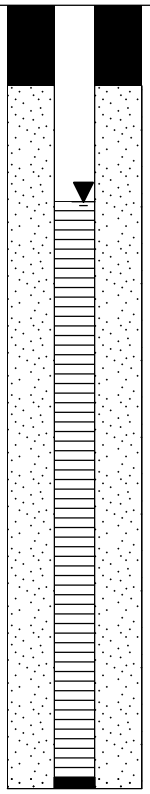
AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty GRAVEL with sand (GM). Pinkish gray (7.5YR, 6/2). Dry to moist. Dense. Gravel to 2" (50% gravel, 20% sand, 30% silt). (Fill material).		352.5			0.1 0.0		0
5	Silty SAND with gravel (SM). Grayish brown (10YR, 5/2). Moist. Medium dense (15% gravel, 55% sand, 30% silt). - Becomes no gravel, dark grayish brown (10YR, 3/2), increased moisture (60% sand, 40% silt) - Becomes light brown (7.5YR, 6/4) with fine to coarse sand and angular, cherty gravel to 1" diameter. (15% gravel, 60% sand, 25% silt). - Becomes wet at 6.0 ft. bgs. - Becomes gravelly (25% gravel, 60% sand, 15% silt), dark yellowish brown (10YR, 4/4).		347.5	21-B26-4.0		0.0 0.0		5
10	- Becomes no gravel (80% sand, 20% silt), very dark grayish brown (10YR, 3/2) - Becomes gravelly (40% gravel, 50% sand, 10% silt). Grayish brown (10YR, 5/2). Cherty cobbles to 2-1/2" diameter. - Becomes little gravel (10% gravel, 70% sand, 20% silt), very dark grayish brown (10YR, 3/2).		342.5			0.2		10
15	Boring terminated at 14 ft. bgs and converted to temporary monitoring well 21-MW-1 on 09/10/2018.		337.5					15
20			332.5					20
25			327.5					25





START DATE:	9/10/2018	TOC ELEVATION:	354.64 ft. amsl
END DATE:	9/10/2018	GROUND ELEVATION:	352.53 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2094369.02 ft.
METHOD:	Hollow Stem Auger	EASTING:	5788550.01 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 1		
LOGGED BY:	M. Wanek		

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SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Well No. 21-MW-1

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210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0	Silty SAND (SM). Yellowish brown (10YR, 5/4), Dry to moist. Loose. Fine- to medium-grained, poorly graded, subangular. (80% sand, 20% silt).		337.8	SNTA-SB1-0.5		0.0		0
	- Becomes siltier (60% sand, 40% silt), strong brown (7.5YR, 5/6). Moist, fine-grained.					0.4		
5	POORLY GRADED SAND with silt (SP-SM). Very pale brown (10YR, 7/4) with orange secondary mineralization. Moist. Medium dense. (90% silt, 10% sand).		332.8			0.3		5
	Silty SAND (SM). Light gray (10YR, 7/1). Moist. Loose. Fine-grained, poorly graded, subangular. (80% sand, 20% silt).							
	Sandy LEAN CLAY (CL). Dark gray (10YR, 4/1) with orange secondary mineralization/weathering. Moist. Medium stiff. Medium plasticity. (25% sand, 75% clay).							
10	Silty SAND (SM). Dark gray (10YR, 4/1). Moist. Loose. Fine-grained, poorly graded, subangular. (85% sand, 15% silt).		327.8					10
	- Becomes siltier (65% sand, 35% silt), well graded, fine- to coarse-grained with abundant secondary mineralization/weathering.					0.7		
	- Becomes light gray (10YR, 7/1), fine-grained, poorly graded.							
	- Becomes light yellowish brown (2.5Y, 6/4), medium dense.							
15			322.8			0.6		15
	- Becomes sandier (80% sand, 20% silt), pale yellow (2.5Y, 7/3).							
	- 0.3 ft. lens of medium- to coarse-grained sand							
20	- 0.3 ft. of sandy gravel with silt (GM) (40% gravel, 40% sand, 20% silt) from 19.8 ft. to 21.1 ft. bgs.		317.8	SNTA-SB1-20		0.7		20
	Weathered BEDROCK (Monterey Formation). Light yellowish brown (2.5Y, 6/4). Dry. Highly weathered. Friable, cherty. Angular rock fragments to 3 inches diameter. Sharp contact at 20.5 ft. bgs.					1.0		
	- Becomes partially indurated.							
25			312.8					25

(CONTINUED ON FOLLOWING FIGURE)

START DATE:	9/11/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/11/2018	GROUND ELEVATION:	337.78 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2095587.76 ft.
METHOD:	Hollow Stem Auger	EASTING:	5787630.79 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 5		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. SNTA-B-1

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
25	Weathered BEDROCK (Monterey Formation). Light yellowish brown (2.5Y, 6/4). Dry. Highly weathered. Friable, cherty. Angular rock fragments to 3 inches diameter. Sharp contact at 20.5 ft. bgs.		312.8					25
	Boring terminated at 28 ft. bgs on 09/11/2018 and backfilled with bentonite-cement grout. No groundwater encountered.							
30			307.8					30
35			302.8					35
40			297.8					40
45			292.8					45
50			287.8					50

START DATE:	9/11/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/11/2018	GROUND ELEVATION:	337.78 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2095587.76 ft.
METHOD:	Hollow Stem Auger	EASTING:	5787630.79 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 5		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. SNTA-B-1

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: PID (ppm)	MONITORING WELL CONSTRUCTION DETAILS AND REMARKS	DEPTH
0			337.9	SNTA-B2-0.5				0
	Silty SAND (SM). Light yellowish brown (10YR, 6/4). Dry. Loose. Fine- to medium-grained, poorly graded, subangular. (60% sand, 40% silt).							
	- Becomes sandier (65% sand, 35% silt), brownish yellow (10YR, 6/6), fine-grained.					0.0		
	- Becomes sandier (75% sand, 25% silt), very pale brown (10YR, 7/4), moist.							
	- Becomes grayish brown (10YR, 5/2) with secondary mineralization (rust-colored oxidation) throughout, medium dense. (70% sand, 30% silt).							
5			332.9					5
						0.1		
	- Becomes siltier (65% sand, 35% silt), dense.							
	- 0.2 ft. lens of lean clay 9.6 to 9.8 ft. bgs (40% silt, 60% clay).							
10			327.9					10
	- Becomes light yellowish brown (2.5Y, 6/4)							
15	- Becomes sandier (75% sand, 25% silt), with dark gray root casts throughout (2.5Y, 6/3)		322.9					15
	- Becomes sandier (80% sand, 20% silt), pale yellow (2.5Y, 7/3), angular							
	- Becomes silter (65% sand, 35% silt), yellowish brown (2.5Y, 6/4), subangular.							
						0.1		
	- Becomes siltier (70% sand, 30% silt), olive yellow (2.5Y, 6/6).							
				SNTA-B2-19				
20	Weathered BEDROCK. Light yellowish brown (2.5Y, 6/4). Moist. Dense. Partially indurated. Friable, cherty, angular rock fragments to 2 inches diameter. Sharp contact at 19.4 ft. bgs.		317.9					20
	Boring terminated at 23.5 ft. bgs on 09/13/2018 and backfilled with cement-bentonite grout. No groundwater encountered.							
25			312.9					25

START DATE:	9/13/2018	TOC ELEVATION:	NA ft. amsl
END DATE:	9/13/2018	GROUND ELEVATION:	337.88 ft. amsl
DRILLER:	S/G Drilling	VERTICAL DATUM:	NAVD88
EQUIPMENT:	CME-75 Drill Rig	NORTHING:	2095634.47 ft.
METHOD:	Hollow Stem Auger	EASTING:	5787560.67 ft.
HOLE DIA.:	8-inch	HORIZONTAL DATUM:	NAD83
SITE:	AFFF Release Area 5		
LOGGED BY:	R. Ofili		

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL BORING / MONITORING WELL RECORD

Project: PFAS Release Site Inspection Area

Project No: 2016186.07

Checked By: J. Harting, PE

Boring No. SNTA-B-2

OTIE An Oneida Nation Company
Oneida Total Integrated Enterprises
9601 McAllister Freeway, Ste. 310
San Antonio, TX 78216
210-541-0646

AMEC SOIL-ROCK-MWELL ENVI 02 VAFB LOGS_AMEC TO004.GPJ AMECFW TEMPLATE.GDT 11/2/18

APPENDIX B-5

SOIL SAMPLE COLLECTION LOGS

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OTIE

SOIL SAMPLE COLLECTION LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186-07
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	VANDENBERG	Date:	9-10-2018
Location ID:	FT021	Technician:	M. Lanek
Other ~~Amec Foster Wheeler~~ OTIE Representatives:	R. Ofli		

Sample ID	Sample Time	Sample Depth (ft)	USCS Symbol	Comments/Observations
~~21-B26-4 MW~~			Gravel (60, 20, 3c, 0)	
21-B26-4.2	1015	4.2-4.7	SM (0, 60, 40, 0)	capillary fringe
21-B27-8.5	1320	8.5-9.0	SM	~~Capillary~~ capillary fringe

Sample Collection Method: HSA 5' x 4" SS core barrel

Analysis/Method(s): EPA 537

Sample Container Type(s): HDPE 250 mL jar

Preservative(s): None

Notes: None

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/12/2018

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SOIL SAMPLE COLLECTION LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Date:	09-11-2018
Location ID:	SNTA	Technician:	Mark Wanek

Other ~~Amec Foster Wheeler~~ OTIE Representatives: Rachel Ofili

Sample ID	Sample Time	Sample Depth (ft)	USCS Symbol	Comments/Observations
SNTA-SB1-0.5	1305	0.0-0.5	SM	Surface
SNTA-SB1-20	1415	20.0-20.5	SM	Directly above soil-WTBr interface

Sample Collection Method:	HSA	Analysis/Method(s):	EPA 537
Sample Container Type(s):	HDPE 250 mL + Gretech	Preservative(s):	None

Notes:

None

Technician Signature:

Mark Wanek

Technician Name (print):

Mark Wanek

QA/QC'd by:

QA/QC Date: 9/12/2018

12 SEPT 2018

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OTIE

SOIL SAMPLE COLLECTION LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Date:	12 Sept 2018
Location ID:	2009 AFFF Release Area	Technician:	Mark Wanek
Other ~~Amec Foster Wheeler~~ OTIE Representatives:	Rachel Ofili		

Sample ID	Sample Time	Sample Depth (ft)	USCS Symbol	Comments/Observations
2009AFFF-B1-0.5	1310	0.0-0.5	SM	Surface
2009AFFF-B1-31.5	1535	31.5-32.0	SM	Soil-bedrock interface
DUP3-2009AFFF-31.5	1540	31.5-32.0	SM	duplicate of 2009AFFF-B1-31.5
2009AFFF-B2-0.5	0945	0.0-0.5	SM	Surface
2009AFFF-B2-33.5	1200	33.5-34.0	SM	Soil-bedrock interface
2009AFFF-COMP-0.5	1325	0.0-0.5	SM	Composite of 2 borings
2009AFFF-COMP-32	1600	31.5-34.0	SM	Composite of 2 borings

Sample Collection Method:	HSA, HA	Analysis/Method(s):	EPA 537
Sample Container Type(s):	250 mL HDPE	Preservative(s):	None

Notes:

None

Technician Signature:

Mark W

Technician Name (print):

Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

9-13-2018

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SOIL SAMPLE COLLECTION LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186-
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Date:	9-13-2018
Location ID:	SNTA	Technician:	Mark Wanek

Other ~~Amec Foster Wheeler~~ OTIE Representatives: Rachel Ofi

Sample ID	Sample Time	Sample Depth (ft)	USCS Symbol	Comments/Observations
SNTA-B2-0.5	0845	0.0-0.5	GM	Gravel-paved surface of FTA
SNTA-B2-19	1000	19.0-19.5	SM	Soil-weathered bedrock contact
21-B28-0.5	1325	0.0-0.5	SM	sfce
21-B28-19	1430	19.4-19.9	SM	Soil-weathered bedrock contact
SNTA-COMP-0.5	1017	0.0-0.5	SM/GM	Composite of sfce at SNTA-B-1; -2
SNTA-COMP-20	1445	19-20.5	SM	Composite of soil-bedrock at SNTA-B-1; -2
21-COMP-0.5	1335	0.0-0.5	SM	Composite of sfce at 21-B-26, -27, ; -28
21-COMP-10	1450	4.5-19.5	SM/WBr	Composite of subsfce at 21-B-26, -27, ; -28

Sample Collection Method:	HA / HSA	Analysis/Method(s):	EPA 537
Sample Container Type(s):	HDPE jar (250 mL)	Preservative(s):	None

Notes:

None

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

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SOIL SAMPLE COLLECTION LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Date:	09-14-2018
Location ID:	2006 Fuel Spill	Technician:	M. Wanek
Other ~~Amec Foster Wheeler~~ OTIE Representatives:	R. Ofili		

Sample ID	Sample Time	Sample Depth (ft)	USCS Symbol	Comments/Observations
2006FS-B1-0.5	0915	0.0-0.5	SM	sfce
2006FS-B1-41	1140	40.8-41.3	SM	cap fringe, perched water (MS-MSD)
2006FS-B2-0.5	1355	0.0-0.5	SM	sfce
2006FS-B2-33	1525	33.0-33.5	SM	cap fringe
2006FS-COMP-0.5	1440	0.0-0.5	SM	composite of sfce soil
2006FS-COMP-37	1530	33-41.5	SM	composite of soil-water interface

Sample Collection Method:	Hand Auger / HSA	Analysis/Method(s):	EPA 537
Sample Container Type(s):	250 mL HDPE jar	Preservative(s):	None

Notes:

None

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

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OTIE

SOIL SAMPLE COLLECTION LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	~~775303191~~ 2016186-07
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	VANDENBERG AFB	Date:	9-17-2018
Location ID:	1992 Fuel Spill	Technician:	Mark Wanek
Other ~~Amec Foster Wheeler~~ OTIE Representatives:	Rachel Ofi		

Sample ID	Sample Time	Sample Depth (ft)	USCS Symbol	Comments/Observations
1992FS-B1-0.5	0910	0.0-0.5	SM	Surface soil
DUP2-1992FS-0.5	0920	0.0-0.5	SM	Duplicate of above sample
1992FS-B1-18	1005	18.0-18.5	SP	capillary fringe
1992FS-B2-0.5	1240	0.0-0.5	SM	Surface soil
1992FS-B2-28.5	1410	28.5-29.0	SM	Capillary fringe

Sample Collection Method:	HSA	Analysis/Method(s):	EPA 537
Sample Container Type(s):	250 mL HDPE	Preservative(s):	None

Notes:

None.

Technician Signature:

Mark Wanek

Technician Name (print):

Mark Wanek

QA/QC'd by:

QA/QC Date: 9/20/2018

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SOIL SAMPLE COLLECTION LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	~~775303101~~ 2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Date:**	09-18-2018
Location ID:	1992 Fuel Spill / 2006 Fuel Spill	**Technician:**	Mark Wanek
Other ~~Amec Foster Wheeler~~ OTIE Representatives:	Rachel Oki		

Sample ID	Sample Time	Sample Depth (ft)	USCS Symbol	Comments/Observations
1992FS-B3-0.5	0800	0.0-0.5	GM	Surface soil
1992FS-B3-23.5	0910	23.5-24.0	SP	Capillary fringe
1992FS-COMP-0.5	0820	0.0-0.5	SM/GM	Composite of surface soil samples
1992FS-COMP-21	0920	18-23	SM	Composite of cap. fringe samples
2006FS-B1-64.3	~~1415~~ 1604	64.3-64.8	SM	capillary fringe*

Sample Collection Method:	HSA	**Analysis/Method(s):**	EPA 537 + TOC + Grain Size
Sample Container Type(s):	250 mL HDPE + 4 oz glass + 8 oz glass	**Preservative(s):**	None

Notes: *Sample "2006FS-B1-64.3" replaced sample "2006FS-B1-41,"* collected on 9-14-18, as well was deepened since no water was observed in original well.

* Placed on hold w/ lab

Technician Signature: [signature]

Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/20/2018

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SOIL SAMPLE COLLECTION LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	~~737503181~~ 2016186-07
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	VANDENBERG AFB	Date:	09-21-18
Location ID:	2006 Fuel Spill	Technician:	Mark Wanek
Other ~~Amec Foster Wheeler~~ OTIE Representatives:	Rachel Ogli		

Sample ID	Sample Time	Sample Depth (ft)	USCS Symbol	Comments/Observations
2006 FS-B2-63	1145	63-63.5	SM	Capillary fringe sample
2006 FS-COMP-63	1200	41-63	SM	Composite of ~~soil and~~ and capillary fringe soil samples from 2006FS-B1 and -B2

Sample Collection Method:	HSA	Analysis/Method(s):	EPA 537 + TOC - Grain Size + Moisture
Sample Container Type(s):	250 mL HDPE + 4oz Glass + 8oz Glass	Preservative(s):	None

Notes: ~~These~~ These samples take place of "2006FS-B2-33+" and "2006FS-COMP-37+," collected on 9-14-2018, as well was deepened since no water in original well.

+ Placed on hold with lab

Technician Signature: Mark Wanek

Technician Name (print): Mark Wanek

QA/QC'd by: [signature]

QA/QC Date: 9/28/2018

APPENDIX B-6

SCREENED WELL CONSTRUCTION FORMS

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SCREENED WELL CONSTRUCTION FORM

Project Name: Site Inspection of AFFF Release Areas Environmental Programs Worldwide

Project Number: 2016186- 07

Contract Number: FA8903-16-D-0027

Task Order: 0004

Installation: Vandenberg AFB

Location ID: FT021

Drilling Subcontractor: S/G Drilling Company

Well ID: ~~21-8-26~~ MW 21-MW-1

Drilling Personnel: T. Blakeborg, N. Dean, N. Navarro

Date: 9/10/18

Technician Name: M. Wanek, R. Ofili

Drilling Method: CME-75 HSA Truck mounted 8" auger

Other Amec Foster Wheeler Representatives: NA

Type of Well: Temporary Well

Measuring Point: GS

TOC/TOR Difference (in) 24

Approximate Diameter of Borehole (in): 8

Depth to Water (ft): 3.51

During Drilling: 0.0

Date: 9/10/18

Post Development: 3.41

Date: 9/21/18

3.51 post drilling

Hydrologic Unit: (circle one):

Unknown	Unsaturated Zone
Aquifer	Water Table Aquifer
Bedrock Aquifer	Confining Layer/Aquiclude
Perched Aquifer	Lower/Confined Aquifer

Water added during drilling (gal): 0

Water removed during development (gal): TBD

Top of Bentonite Seal (ft): ~~NA~~ 0.0

Top of Filter Pack (ft): ~~2.9~~ 1.4

Top of Screen Interval (ft): 3.4

Bottom of Screened Interval (ft): 13.4

Bottom of Filter Pack (ft): 13.6

Bottom of Borehole (ft): ~~13.~~ 13.6

Notes: ~~Surged w/~~ None

Protective Casing:

- **Type:** ~~Sch 40 PVC~~ NA
- **Dimensions (in):** ~~2~~ NA
- **Stickup (ft):** ~~2~~ NA
- **Length (ft):** NA
- **Guard Post:** NA

Surface Pad:

- **Type:** NA
- **Length (ft):** NA
- **Width (ft):** NA
- **Thickness (in):** NA

Annular Seal (grout above well seal):

- **Material:** NA
- **Installation Method:** NA

Bentonite Seal:

- **Manufacturer:** NA
- **Material:** NA
- **Type:** NA
- **Installation Method:** NA
- **Hydration time (hrs):** NA

Filter Pack Material:

- **Manufacturer:** Cemex
- **Material:** Clean, graded, kiln dried monterey sands
- **Size:** #2-16
- **Installation Method:** gravity
- **Surging time:** 5 min

Well Casing (Riser):

- **Manufacturer:** Driller's Pipe Manufacturing, Inc
- **Type/Material:** Sch 40 PVC
- **Length:** 5'
- **Diameter (in):** 2

Well Screen:

- **Manufacturer:** Driller's Pipe Manufacturing, Inc
- **Type/Material:** Sch 40 PVC
- **Diameter (in):** 2
- **Slot Size (in):** 0.010
- **Slot Type:** flat

Sump/End Cap: 0.2 ft.

Technician Signature: Rachel Ofili

Technician Name (print): Rachel Ofili

Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

QA/QC'd by:

QA/QC Date: 9/12/2018

amec foster wheeler

OTIE

SCREENED WELL CONSTRUCTION FORM

Project Name: Site Inspection of AFFF Release Areas Environmental Programs Worldwide

Project Number: 2016186-07

Contract Number: FA8903-16-D-0027

Task Order: 0004

Installation: VANDENBERG AFB

Location ID: 1992 Fuel Spill

Drilling Subcontractor: S/G Drilling

Well ID: 1992FS-MW-1

Drilling Personnel: T. Blakeburn, N. Navarro, N. Dean

Date: 17-Sept 2018

Technician Name: Mark Wanek

Drilling Method: 8" HSA

Other ~~Amec Foster Wheeler~~ OTIE Representatives: Rachel Ofili

Type of Well: Temporary Monitoring

Measuring Point: TOC / BGS

TOC/TOR Difference (in) Ø

Approximate Diameter of Borehole (in): 8"

Depth to Water (ft): 18.3' (17.94 @ 0807 9/19/18)

During Drilling: 18.0'

Date: 9-17-2018

Post Development: —

Date: —

Hydrologic Unit: (circle one):

Unknown	Unsaturated Zone
Aquifer	Water Table Aquifer
Bedrock Aquifer	Confining Layer/Aquiclude
Perched Aquifer	Lower/Confined Aquifer

Water added during drilling (gal): Ø

Water removed during development (gal): ~~TBD~~ 22

Top of Bentonite Seal (ft): 10.5

Top of Filter Pack (ft): 14.1

Top of Screen Interval (ft): 16.0

Bottom of Screened Interval (ft): 26.0

Bottom of Filter Pack (ft): 26.5

Bottom of Borehole (ft): 26.5

Protective Casing:
- Type:
- Dimensions (in):
- Stickup (ft):
- Length (ft): N/A
- Guard Post:

Surface Pad:
- Type:
- Length (ft):
- Width (ft): N/A
- Thickness (in):

Annular Seal (grout above well seal):
- Material:
- Installation Method: N/A

Bentonite Seal:
- Manufacturer: Wyo Ben
- Material: ~~AA~~ Envirosplus medium chips
- Type: Medium chips
- Installation Method: gravity
- Hydration time (hrs): 48 hrs

Filter Pack Material:
- Manufacturer: Lapis-Lustre
- Material: Monterey Sand
- Size: #2/16
- Installation Method: Gravity
- Surging time: 10 mins

Well Casing (Riser):
- Manufacturer: Drillers Pipe Manufacturing
- Type/Material: Sch. 40 PVC
- Length: 16'
- Diameter (in): 2"

Well Screen:
- Manufacturer: Drillers Pipe Manufacturing
- Type/Material: Sch. 40 PVC
- Diameter (in): 2"
- Slot Size (in): 0.010
- Slot Type: Slotted plastic, machine

Sump/End Cap: 0.2'

Notes: None

Technician Signature: Mark Wanek

Technician Name (print): Mark Wanek

Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

QA/QC'd by:

QA/QC Date: 9/20/2018

amec foster wheeler

OTIE

SCREENED WELL CONSTRUCTION FORM

Project Name: Site Inspection of AFFF Release Areas Environmental Programs Worldwide

Project Number: 2016186-07

Contract Number: FA8903-16-D-0027

Task Order: 0004

Installation: Vandenberg AFB

Location ID: 1992 Fuel Spill

Drilling Subcontractor: S/S Drilling

Well ID: 1992FS-MW-2

Drilling Personnel: T. Blackburn, N. Dean, N. Navarro

Date: 9-17-18

Technician Name: Mark Wenek

Drilling Method: HSA

Other ~~Amec Foster Wheeler~~ OTIE Representatives: Rachel Ofili

Type of Well: Temporary Mon. Well

Measuring Point: Ground Surface

TOC/TOR Difference (in) Ø

Approximate Diameter of Borehole (in): 8"

Depth to Water (ft): 27

During Drilling: ~~27~~ 35'

Date: 9/17/18

Post Development: 25.16

Date: 9-20-18

Hydrologic Unit: (circle one):

- (Unknown)
- (Aquifer)
- Bedrock Aquifer
- (Perched Aquifer)
- Unsaturated Zone
- Water Table Aquifer
- Confining Layer/Aquiclude
- Lower/Confined Aquifer

Water added during drilling (gal): Ø

Water removed during development (gal): 7

Top of Bentonite Seal (ft): 18.7

Top of Filter Pack (ft): 22.6

Top of Screen Interval (ft): 24.6

Bottom of Screened Interval (ft): 34.6

Bottom of Filter Pack (ft): 35.0

Bottom of Borehole (ft): 35.0

Protective Casing:
- Type:
- Dimensions (in):
- Stickup (ft): N/A
- Length (ft):
- Guard Post:

Surface Pad:
- Type:
- Length (ft):
- Width (ft): N/A
- Thickness (in):

Annular Seal (grout above well seal):
- Material:
- Installation Method: N/A

Bentonite Seal:
- Manufacturer: Wyo Ben
- Material: Bentonite
- Type: Medium chips
- Installation Method: Gravity
- Hydration time (hrs): 48 hrs

Filter Pack Material:
- Manufacturer: Lapis Lustre
- Material: Monterey Sand
- Size: #2/16
- Installation Method: Gravity
- Surging time: 5 min

Well Casing (Riser):
- Manufacturer: Drillers Pipe Manufacturing
- Type/Material: Sch 40 PVC
- Length: 24.6
- Diameter (in): 2

Well Screen:
- Manufacturer: Drillers Pipe Manufacturing
- Type/Material: Sch 40 PVC
- Diameter (in): 2
- Slot Size (in): 0.010
- Slot Type: slotted plastic, machine

Sump/(End Cap): 0.2'

Notes:

Slow recharge

Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

Technician Signature: [signature]

Mark Wenek

Technician Name (print):

QA/QC'd by: [signature]

QA/QC Date: 9/20/2018

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SCREENED WELL CONSTRUCTION FORM

Project Name: Site Inspection of AFFF Release Areas Environmental Programs Worldwide

Project Number: 2016186-07

Contract Number: FA8903-16-D-0027

Task Order: 0004

Installation: Vandenberg AFB

Location ID: 1992 Fuel Spill

Drilling Subcontractor: S/G Drilling

Well ID: 1992FS-MW-3

Drilling Personnel: T. Rebelobo, N. Tran, N. Navarro

Date: 9-18-2018

Technician Name: Mark Wanek

Drilling Method: HSA

Other ~~Amec Foster Wheeler~~ OTIE Representatives: Rachel Ofili

Type of Well: Temp. Monitoring Well

Measuring Point: ground Sfce

TOC/TOR Difference (in) ∅

Approximate Diameter of Borehole (in): 8"

Depth to Water (ft): 26.48

During Drilling: 24

Date: 9/18/18

Post Development: 26.48'

Date: 9/20/18

Hydrologic Unit: (circle one)

- (Unknown) Aquifer
- Bedrock Aquifer
- (Perched Aquifer)
- Unsaturated Zone
- Water Table Aquifer
- Confining Layer/Aquiclude
- Lower/Confined Aquifer

Water added during drilling (gal): Ø

Water removed during development (gal): ~~TBD~~ 5

Top of Bentonite Seal (ft): 18.0

Top of Filter Pack (ft): 21.1

Top of Screen Interval (ft): 23.3

Bottom of Screened Interval (ft): 33.3

Bottom of Filter Pack (ft): 34.0

Bottom of Borehole (ft): 34.0

Protective Casing:

- **Type:** N/A
- **Dimensions (in):**
- **Stickup (ft):**
- **Length (ft):**
- **Guard Post:** N/A

Surface Pad:

- **Type:**
- **Length (ft):** N/A
- **Width (ft):**
- **Thickness (in):** N/A

Annular Seal (grout above well seal):

- **Material:** ~~Wyo Ben~~ N/A
- **Installation Method:** N/A

Bentonite Seal:

- **Manufacturer:** Wyo Ben
- **Material:** bentonite
- **Type:** Med. chips
- **Installation Method:** Gravity
- **Hydration time (hrs):** 48 hrs

Filter Pack Material:

- **Manufacturer:** Lapis Lustre
- **Material:** Monterey sand
- **Size:** #2/16
- **Installation Method:** Gravity
- **Surging time:** 5' min

Well Casing (Riser):

- **Manufacturer:** Driller's Pipe Manufacturing
- **Type/Material:** sch. 40 PVC
- **Length:** 23.3
- **Diameter (in):** 2

Well Screen:

- **Manufacturer:** Driller's Pipe Mfking
- **Type/Material:** sch 40 PVC
- **Diameter (in):** 2
- **Slot Size (in):** 0.010"
- **Slot Type:** slotted plastic, machine

Sump/End Cap: 0.2'

Notes:

None

Technician Signature: [signature]

Mark Wanek

Technician Name (print):

Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

QA/QC'd by: [signature]

QA/QC Date: 9/20/2018

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SCREENED WELL CONSTRUCTION FORM

Project Name: Site Inspection of AFFF Release Areas Environmental Programs Worldwide

Project Number: 2016186-07

Contract Number: FA8903-16-D-0027

Task Order: 0004

Installation: VANDENBERG AFB

Location ID: 2006 Fuel Spill

Drilling Subcontractor: S/G Drilling

Well ID: 2006FS-MW-1

Drilling Personnel: T. Blackburn, N. Dean, N. Navarro

Date: 9-19-2018

Technician Name:

Drilling Method: HSA

Other ~~Amec Foster Wheeler~~ OTIE Representatives: Rachel Ofili

Type of Well: Temp. Monitoring Well

Measuring Point: ground sfce

TOC/TOR Difference (in) Ø

Approximate Diameter of Borehole (in): 8"

Depth to Water (ft): 66.21

During Drilling: 65

Date: 9/19/18

Post Development: 66.21

Date: 9/21/18

Hydrologic Unit: (circle one):

- Unknown
- Aquifer
- Bedrock Aquifer
- Perched Aquifer
- Unsaturated Zone
- Water Table Aquifer
- Confining Layer/Aquiclude
- Lower/Confined Aquifer

Water added during drilling (gal): Ø

Water removed during development (gal): 50

Top of Bentonite Seal (ft): 58.0

Top of Filter Pack (ft): 61.1

Top of Screen Interval (ft): 63.2

Bottom of Screened Interval (ft): 73.2

Bottom of Filter Pack (ft): 73.5

Bottom of Borehole (ft): 73.5

Protective Casing:

- Type:
- Dimensions (in):
- Stickup (ft):
- Length (ft): N/A
- Guard Post:

Surface Pad:

- Type:
- Length (ft):
- Width (ft): N/A
- Thickness (in):

Annular Seal (grout above well seal):

- Material:
- Installation Method: N/A

Bentonite Seal:

- Manufacturer: Wyo Ben
- Material: Bentonite
- Type: med. chips
- Installation Method: Gravity
- Hydration time (hrs): 24

Filter Pack Material:

- Manufacturer: Lapis Lustre
- Material: Monterey Sand
- Size: #2/16
- Installation Method: Gravity
- Surging time: 5 min

Well Casing (Riser):

- Manufacturer: Drillers Pipe Manufacturing
- Type/Material: Sch. 40 PVC
- Length: 63.2
- Diameter (in): 2

Well Screen:

- Manufacturer: Drillers Pipe Manufacturing
- Type/Material: Sch. 40 PVC
- Diameter (in): 2
- Slot Size (in): 0.
- Slot Type: Slotted plastic, machine

Sump/End Cap: 0.2'

Notes:

Replaces Constr. Form dated 14 Sept 2018

Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

Technician Signature:

Mark Vanek

Technician Name (print):

QA/QC'd by:

QA/QC Date: 9/21/2018

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SCREENED WELL CONSTRUCTION FORM

Project Name: Site Inspection of AFFF Release Areas Environmental Programs Worldwide

Project Number: 2016186- 07

Contract Number: FA8903-16-D-0027

Task Order: 0004

Installation: Vandenberg AFB

Location ID: 2006 Fuel Spill

Drilling Subcontractor: S/G Drilling

Well ID: 2006FS-MW-1

Drilling Personnel: T. Blinkhorn, N. Nevarez, N. Dean

Date: ~~2018~~ 14 Sept 2018

Technician Name: Mark Wanek

Drilling Method: HSA

Other ~~Amec Foster Wheeler~~ OTIE Representatives: Rachel Ofili

Type of Well: Temporary

Measuring Point: TOC = Ground Surface

TOC/TOR Difference (in) 0.0

Approximate Diameter of Borehole (in): 2"

Depth to Water (ft): N/A*

During Drilling: 41.5'

Date: 9-14-2018

Post Development: TBD

Date: TBD

Hydrologic Unit: (circle one):

Unknown	Unsaturated Zone
Aquifer	Water Table Aquifer
Bedrock Aquifer	Confining Layer/Aquiclude
Perched Aquifer	Lower/Confined Aquifer

Water added during drilling (gal): 0

Water removed during development (gal): TBD

Top of Bentonite Seal (ft): 31.5

Top of Filter Pack (ft): 36.5

Top of Screen Interval (ft): 38.6

Bottom of Screened Interval (ft): 48.6

Bottom of Filter Pack (ft): 49.5

Bottom of Borehole (ft): 49.5

Protective Casing:

- **Type:** N/A
- **Dimensions (in):** N/A
- **Stickup (ft):** N/A
- **Length (ft):** N/A
- **Guard Post:** N/A

Surface Pad:

- **Type:** N/A
- **Length (ft):** N/A
- **Width (ft):** N/A
- **Thickness (in):** N/A

Annular Seal (grout above well seal): N/A

- **Material:** ~~Cementing mat. bent. chips~~
- **Installation Method:** N/A

Bentonite Seal:

- **Manufacturer:** Wyo Ben
- **Material:** bentonite
- **Type:** Med. chips
- **Installation Method:** gravity-fed, 6" lifts
- **Hydration time (hrs):** 48 hrs

Filter Pack Material:

- **Manufacturer:** Lapis Lustre
- **Material:** Monterey sand
- **Size:** #2/16
- **Installation Method:** gravity
- **Surging time:** N/A* (No gas in well at time of installation)

Well Casing (Riser):

- **Manufacturer:** Driller's Pipe Manufacturing
- **Type/Material:** Sch. 40 PVC
- **Length:** 38.6
- **Diameter (in):** 2"

Well Screen:

- **Manufacturer:** Driller's Pipe Manufacturing
- **Type/Material:** Sch. 40 PVC
- **Diameter (in):** 2"
- **Slot Size (in):** 0.010
- **Slot Type:** ~~[illegible]~~ slotted plastic

Sump/End Cap: 0.2' end cap

Notes:

* No water present during well installation

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88).

Technician Signature: Mark Wanek

Technician Name (print): Mark Wanek

QA/QC'd by: [illegible]

QA/QC Date: 9/17/2018

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OTIE

SCREENED WELL CONSTRUCTION FORM

Project Name: Site Inspection of AFFF Release Areas Environmental Programs Worldwide

Project Number: 2016186-07

Contract Number: FA8903-16-D-0027

Task Order: 0004

Installation: VANDENBERG AFB

Location ID: 2006 FUEL SPILL

Drilling Subcontractor: S/G DRILLING

Well ID: 2006FS-MW-2

Drilling Personnel: T. Blakebrow, N. Dean, N. Navarro

Date: 9-24-2018

Technician Name: Mark Wanek

Drilling Method: HSA

Other ~~Amec Foster Wheeler~~ OTIE Representatives: N/A

Type of Well: TEMP MONITORING WELL

Measuring Point: Ground Surface

TOC/TOR Difference (in) –

Approximate Diameter of Borehole (in): 8

Depth to Water (ft): ~~63.6'~~ 64.28

During Drilling: 63.6'

Date: 9-21-18

Post Development: TBD

Date: TBD

Hydrologic Unit: (circle one):

Unknown	Unsaturated Zone
Aquifer	Water Table Aquifer
Bedrock Aquifer	Confining Layer/Aquiclude
Perched Aquifer	Lower/Confined Aquifer

Water added during drilling (gal): Ø

Water removed during development (gal): TBD

Top of Bentonite Seal (ft): 56.8

Top of Filter Pack (ft): 61.5

Top of Screen Interval (ft): 63.6

Bottom of Screened Interval (ft): 73.6

Bottom of Filter Pack (ft): 74.0

Bottom of Borehole (ft): 74

Protective Casing:
- Type:
- Dimensions (in):
- Stickup (ft): N/A
- Length (ft):
- Guard Post:

Surface Pad:
- Type:
- Length (ft):
- Width (ft): N/A
- Thickness (in):

Annular Seal (grout above well seal):
- Material:
- Installation Method: N/A

Bentonite Seal:
- Manufacturer: Wyo Ben
- Material: ~~Hydro~~ Bentonite
- Type: Med. chips
- Installation Method: Gravity
- Hydration time (hrs): 24 hrs

Filter Pack Material:
- Manufacturer: Lapis Lustre
- Material: Monterey SAND
- Size: #2/16
- Installation Method: Gravity
- Surging time: 5 min

Well Casing (Riser):
- Manufacturer: DRILLER'S PIPE Mfg
- Type/Material: Sch. 40 PVC
- Length: 63.6
- Diameter (in): 2"

Well Screen:
- Manufacturer: DRILLER'S PIPE MANUFACTURING
- Type/Material: Sch. 40 PVC
- Diameter (in): 2
- Slot Size (in): 0.010
- Slot Type: slotted plastic, machine

Sump/End Cap: 0.2'

Notes:
Replace well construction for ~~2006~~ 2006-MW-2 dated 9-14-18.

Depths and heights are referenced to ground surface unless specified TOC.
All elevations are referenced to MSL (NAVD 88).

Technician Signature:

Technician Name (print): MARK WANEK

QA/QC'd by:

QA/QC Date: 9/28/2018

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SCREENED WELL CONSTRUCTION FORM

Project Name: Site Inspection of AFFF Release Areas Environmental Programs Worldwide

Project Number: 2016186-07

Contract Number: FA8903-16-D-0027

Task Order: 0004

Installation: Vandenberg AFB

Location ID: 2006 Fuel Spill

Drilling Subcontractor: S/G Drilling

Well ID: 2006FS-MW-2

Drilling Personnel: T. Blakeborg, N. Navarro, N. Dean

Date: 9-14-2018

Technician Name: Mark Wanek

Drilling Method: 8" HSA

Other ~~Amec Foster Wheeler~~ OTIE Representatives: Rachel Ofili

Type of Well: Temporary monitoring well

Measuring Point: bgs = TOC

TOC/TOR Difference (in) ∅

Approximate Diameter of Borehole (in): 8"

Depth to Water (ft): 33.5 (in Soil Core)

During Drilling: 33.5

Date: 9-14-2018

Post Development: N/A

Date: N/A

Hydrologic Unit: (circle one):

Unknown	Unsaturated Zone
Aquifer	Water Table Aquifer
Bedrock Aquifer	Confining Layer/Aquiclude
Perched Aquifer	Lower/Confined Aquifer

Water added during drilling (gal): ∅

Water removed during development (gal): N/A

Top of Bentonite Seal (ft): 22.8'

Top of Filter Pack (ft): 25.3

Top of Screen Interval (ft): 27.3'

Bottom of Screened Interval (ft): 37.3'

Bottom of Filter Pack (ft): ~~37.5~~ 38.0'

Bottom of Borehole (ft): ~~37.5'~~ 38.0'

Protective Casing:

- **Type:**
- **Dimensions (in):**
- **Stickup (ft):** N/A
- **Length (ft):**
- **Guard Post:**

Surface Pad:

- **Type:**
- **Length (ft):** N/A
- **Width (ft):**
- **Thickness (in):**

Annular Seal (grout above well seal):

- **Material:** N/A
- **Installation Method:** N/A

Bentonite Seal:

- **Manufacturer:** Wyo Ben
- **Material:** Med Bentonite chips
- **Type:** Medium
- **Installation Method:** Gravity
- **Hydration time (hrs):** 48 hrs

Filter Pack Material:

- **Manufacturer:** Lapis Lustre
- **Material:** Monterey
- **Size:** #2/16
- **Installation Method:** Gravity
- **Surging time:** N/A* (No gw at time of installation of well)

Well Casing (Riser):

- **Manufacturer:** Drillers Pipe Manufacturing
- **Type/Material:** Sch. 40 PVC
- **Length:** 27.3'
- **Diameter (in):** 2"

Well Screen:

- **Manufacturer:** Drillers Pipe Manufacturing
- **Type/Material:** Sch. 40 PVC
- **Diameter (in):** 2"
- **Slot Size (in):** 0.010
- **Slot Type:** slotted plastic, machine

Sump/End Cap: 0.2'

Notes:

* Water observed in soil core, No measurable water in well.

Depths and heights are referenced to ground surface unless specified TOC.

All elevations are referenced to MSL (NAVD 88).

Technician Signature: [signature]

Technician Name (print): Mark Wanek

QA/QC'd by: [signature]

QA/QC Date: 9/17/2018

APPENDIX B-7

WELL DEVELOPMENT LOGS

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WELL DEVELOPMENT LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	WANSEBERG AFB / FTCZ1	**Sample Technician:**	Mark Wanek / Rachel Chili
Well ID:	X-MW-21-MW-1	**Date Started/Date Completed:**	9-19-2018
Measuring Point:	~~TOC~~ GS	**Initial Depth to Water (ft):**	3.44
Development Method:	surge, ss bails, pump	**Total Depth of Well (ft):**	13.2
Pump Start Date/Time:	9/19/18/ 15:24	**Depth to Water After Purging (ft):**	4.64
Pump Start Rate:	0.2 gal/min	**1 Casing Volume (gal):**	1.59
Total Volume Purged (gal):	50	**3 Casing Volumes (gal):**	4.78

Time	Intake Depth (feet)	Water Level (feet)	Rate gal/min	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU) 50 NTU	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
13:50	–	3.44	–							0	begin surge, H_2S odor
13:55	–	3.44	–							0	begin bailing
14:00	–	3.57	–							1.5	opaque, brown, silty
14:10	–	4.31	–							6.5	" "
14:25	–	4.05	–							16.5	" "
14:45	13.0	8.5	1							26.5	" "
15:15	13.0	8.40	2.5							~~12.5~~ 31.5	milky brown
15:17	13.0	12.2	2.5							36.5	brown, opaque
15:18	13.0	12.80	2.5							~~2.5~~ 39	" "
15:29	8.0	4.06	0.2	~~5.50~~ 22.94	5.53	0.70	2.62	-46.0	105.3	39	milky ~~brown~~ white
15:34	8.0	4.28	0.2	20.70	5.62	0.73	2.61	-51.4	100.1	40	milky " "
15:39	8.0	4.35	0.2	20.45	5.66	0.73	1.98	-49.3	90.6	41	" "
15:44	8.0	4.39	0.2	20.41	5.68	0.74	1.72	-48.0	95.1	42	" "
15:49	8.0	4.40	0.2	20.32	5.69	0.74	1.40	-47.3	98.7	43	milky white
15:54	8.0	4.46	0.2	20.30	5.69	0.74	1.19	-46.1	91.6	44	" "
15:59	8.0	4.34	0.2	20.29	5.68	0.74	1.13	-45.0	91.3	45	" "
16:04	8.0	4.23	0.2	20.47	5.66	0.73	1.06	-43.6	70.6	46	" "
16:09	8.0	4.18	0.2	20.43	5.68	0.73	1.01	-42.1	68.4	47	hazy, almost clear
16:14	8.0	4.03	0.2	20.55	5.68	0.73	1.10	-40.5	62.5	48	smoky, hazy, almost clear
16:19	8.0	4.60	0.2	20.12	5.69	0.74	0.86	-43.3	54.0	49	clearing

Instruments (Manufacturer, Model, and Serial No.):
In-Situ SmarTROLL #466238
Lamotte 2020we turb. meter #6054-4515

Calculations:

Saturated well casing volume: V= Π(R^2)H*7.48 gal/ft^3 = $V = \pi(2^2)(9.76) \times 7.48 \frac{gal}{ft^3} = 1.59\ gal$

V = Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2) =
H = height of water column (ft)

$H = 13.2' - 3.44' = 9.76'$

Technician Signature:

Notes: None

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/21/2018

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WELL DEVELOPMENT LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	VANDENBERG AFB	**Sample Technician:**	
Well ID:	21-MW-1	**Date Started/Date Completed:**	
Measuring Point:		**Initial Depth to Water (ft):**	
Development Method:		**Total Depth of Well (ft):**	
Pump Start Date/Time:		**Depth to Water After Purging (ft):**	
Pump Start Rate:		**1 Casing Volume (gal):**	
Total Volume Purged (gal):		**3 Casing Volumes (gal):**	

Time	Intake Depth (feet)	Water Level (feet)	Rate	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
16:24	8.0	4.64	0.2	20.08	5.69	0.74	0.83	41.0	48.8	50	clear

Instruments (Manufacturer, Model, and Serial No.):

Calculations:

Saturated well casing volume: V= Π(R^2)H*7 48 gal/ft^3

V = Volume (gal/ft)
Π = 3 14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

Technician Signature:

Notes:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/21/2018

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WELL DEVELOPMENT LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07-0110
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Sample Technician:	R. Ofili / M. Wanek
Well ID:	1992FS-MW-1	Date Started/Date Completed:	9/20/18 / 9/20/18
Measuring Point:	TOC	Initial Depth to Water (ft):	17.36
Development Method:	surge, ss bail, pump	Total Depth of Well (ft):	26.2
Pump Start Date/Time:	9/20/18 / 13:12	Depth to Water After Purging (ft):	19.00
Pump Start Rate:	0.25 gal/min	1 Casing Volume (gal):	1.50
Total Volume Purged (gal):	22.25	3 Casing Volumes (gal):	4.5

Time	Intake Depth (feet)	Water Level (feet)	Rate gal/min	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
11:35		17.36	- begin surge							0	~~very~~
11:40		17.36	- end surge; begin bail							0	
12:00		7.81								5	very foamy, milky brown, silty
12:20		8.40								10	" "
12:35	24	8.40	1	- begin pumping						10	" "
12:40	24	23.12	1							15	purged dry
13:12	22	18.12	0.25	24.35	6.55	1.70	–	51.2	135	15	hazy, milky
13:17	22	18.92	0.25	21.05	6.38	1.73	–	41.6	28.4	16.25	~~almost~~ clear
13:22	22	19.13	0.2	21.23	6.35	1.74	–	28.2	28.2	17.25	clear
13:27	22	19.13	0.2	21.29	6.35	1.79	–	21.0	51.7	18.25	almost clear
13:32	22	19.10	0.2	21.32	6.38	1.92	–	13.7	39.1	19.25	clear
13:37	22	19.00	0.2	21.92	6.43	1.95	–	~~8.06~~ 8.3	32.0	20.25	" "
13:42	22	19.19	0.2	21.90	6.38	1.86	–	13.5	48.2	21.25	almost clear
13:47	22	19.00	0.2	21.48	6.37	1.84	–	12.2	21.8	22.25	" "

Instruments (Manufacturer, Model, and Serial No.):
YSI-Site Sonde Troll # 466238
LaMotte Turbidimeter # 6059-4515

Calculations:

Saturated well casing volume: V= Π(R^2)H*7.48 gal/ft^3

$$V = \pi(2^2)(9.24' \times 7.48 \frac{gal}{ft^3}) =$$

V = Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

$$H = 9.24' \times 0.1628$$

Technician Signature:

Notes: RDO cap expired, replacement unit pending

Technician Name (print): Mark Wanek

QA/QC'd by: QA/QC Date: 9/21/2018

amec foster wheeler

OTIE

WELL DEVELOPMENT LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	~~775303101~~ 2016186-07
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	VANDENBERG AFB	Sample Technician:	Mark Wanek
Well ID:	1992FS-MW-2	Date Started/Date Completed:	09/20/18 / 09/20/18
Measuring Point:	TOC	Initial Depth to Water (ft):	25.16
Development Method:	Surge-bail ~~pump~~ mw	Total Depth of Well (ft):	34.8
Pump Start Date/Time:	N/A	Depth to Water After Purging (ft):	34.2
Pump Start Rate:	N/A	1 Casing Volume (gal):	1.47
Total Volume Purged (gal):	4 gal	3 Casing Volumes (gal):	4.4

Time	Intake Depth (feet)	Water Level (feet)	Rate	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
1255	—	25.16	—	—	—	—	—	—	—	Ø	Initial msmt
1300											Begin surge
1320	—	25.16									End surge
1320	Begin bailing									0.25	Very turb'd/opaque - brown sandy
1350	—	34.20								3	Bailed dry - Allow recharge
1450	—	28.42									Slow recharge (80%R = 27.08)
1525	—	27.72									
1526	—	27.72									Surge again
1534	—	27.70									Begin bailing 2nd time
1540	—	34.3								4	Bailed dry - very turb'd/opaque

Instruments (Manufacturer, Model, and Serial No.):
SmartTroll # 466238
Lamotte 2020we Turb meter # 6054-4515

Calculations:

Saturated well casing volume: V= Π(R^2)H*7 48 gal/ft^3

$V_{casing} = \pi (1/12)^2 (34.8 - 25.16)(7.48)$
$= 1.47$ gal

V = Volume (gal/ft)
Π = 3 14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

Technician Signature:

Notes: Slow recharging well: well developed dry after approx 3 casing volumes (total) removed. In accordance with SOP AFW-05 dated 7-31-18, best achievable water qual. ~~[illegible]~~ obtained (no observed change) after 2 rounds of development; recharge -

Technician Name (print): Mark Wanek

QA/QC'd by: QA/QC Date: 9/18/2018

amec foster wheeler

OTIE

WELL DEVELOPMENT LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07-0110
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Sample Technician:	R. Ofili / M. Wawek
Well ID:	1992B-MW-3	Date Started/Date Completed:	9/20/18 / 9/20/18
Measuring Point:	GS	Initial Depth to Water (ft):	26.48
Development Method:	Surge, bail	Total Depth of Well (ft):	33.5
Pump Start Date/Time:	N/A	Depth to Water After Purging (ft):	31.80
Pump Start Rate:	N/A	1 Casing Volume (gal):	1.14
Total Volume Purged (gal):	5.0	3 Casing Volumes (gal):	3.42

Time	Intake Depth (feet)	Water Level (feet)	Rate	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
14:37	—	26.48	- begin surge			—	—	—	—	0	—
14:42	—	26.48	- end surge, begin bail					—	—	0	—
14:55	—	31.60	- bailed 3 casing volumes					—	—	3.5	milky brown
15:05	—	31.80	- Well bailed dry				—	—	—	5.0	" "

Instruments (Manufacturer, Model, and Serial No.):
Durham Geo Slope Indicator Water Level Indicator #1637211
SS 2" bailer

Calculations:

Saturated well casing volume: V= Π(R^2)H*7.48 gal/ft^3

V = Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2
H = height of water column (ft)

$V = \pi (2^2)(7.02 \times 7.48 \frac{gal}{ft^3}) = 1.14$ gal $\times 3 = 3.42$ gal

$H = 7.02'$

Technician Signature:

Notes: Well recharge was slow, well bailed dry after 5 gal was bailed. Unable to reach any parameters.

Technician Name (print): Rachel Ofili

QA/QC'd by:

QA/QC Date: 9/18/2018

amec foster wheeler

OTIE

WELL DEVELOPMENT LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07-0110
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Sample Technician:	R. Chli, M. Wanek
Well ID:	2006 FS-MW-1	Date Started/Date Completed:	9/20/18 - 9/21/18
Measuring Point:	TOC	Initial Depth to Water (ft):	66.21
Development Method:	surge, sr bail, pump	Total Depth of Well (ft):	73.4
Pump Start Date/Time:	9/20/18 ; 1115	Depth to Water After Purging (ft):	72.18'
Pump Start Rate:	0.2 gpm	1 Casing Volume (gal):	1.17
Total Volume Purged (gal):	8	3 Casing Volumes (gal):	3.5

	Time	Intake Depth (feet)	Water Level (feet)	Rate	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
9/20	16:55	—	66.21	— begin surge							0	—
	17:00	—	66.21	— begin ~~purge~~ bail, and surge						—	0	milky, silty
	17:20	—	69.04	— end bail							3.5	" "
9/21	11:15	72.90	68.22	— begin purge							3.5	~~milky~~ milky brown, ~~silty~~ silty, ~~grey~~
	11:24	72.90	71.80	0.2	23.63	7.03	3.22	5.34	78.2	1000+	7.0	drawing down too quick
	12:02	70.02	70.02	0.2	23.16	7.10	2.34	7.24	53.0	1000+	8.0	milky brown
	12:07	72.90	72.10	0.2								drawing down too quick - shut off pump and allow to recharge

Instruments (Manufacturer, Model, and Serial No.):
Solinst Troll # 486391 X
Lamotte Turb # 6054-4515

Calculations:

Saturated well casing volume: V= Π(R^2)H*7.48 gal/ft^3 = π (½)(73.4-66.21)(7.48) = 1.17 gal

V = Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

H = 7.19' = 73.4 - 66.21

Technician Signature:

Notes: Slow recharge: In accordance w/ SOP AFW-05, dated 7-31-18, well was bailed dry, and allowed to recover to 80% ~~recharge~~ of static water level prior to development, then add'l development was conducted.

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/28/2018

amec foster wheeler

OTIE

WELL DEVELOPMENT LOG

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186-07
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	VANDENBERG AFB	Sample Technician:	M. Wanek + R. Ofi
Well ID:	2006FS-MW-2	Date Started/Date Completed:	9-25-2018 / 9-25-2018
Measuring Point:	TOC	Initial Depth to Water (ft):	64.71
Development Method:	Surge-bail-pump	Total Depth of Well (ft):	73.8'
Pump Start Date/Time:	9-25-2018 / 1700	Depth to Water After Purging (ft):	~~73.0~~ MW 69.19
Pump Start Rate:	1 gpm	1 Casing Volume (gal):	1.5
Total Volume Purged (gal):	21	3 Casing Volumes (gal):	4.5

Time	Intake Depth (feet)	Water Level (feet)	Rate	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Cum. Volume (gal.)	Comments/Observations During Purging (color, sediment, etc.)
1620	—	64.71	—	—	—	—	—	—	—	~~1~~	Initial DTW pre-purge
1625	—	64.71									Begin Surge
1630		64.71									End Surge/begin Bail
1643	—	66.32								~~MW~~ 1.5	Very muddy
1653	—	66.81								3	
1700	~~72.0~~ 73 MW	66.5	1.0							3	Begin pumping
1705	73	72.0	1.0							8	Stop pump and allow for recovery to lower rate
1738	72	70.20	0.3	21.29	6.25	1.23	1.55	72.8	1500	15	milky, beige
1743	72	~~69.65~~ 70.24 MW	0.3	21.61	6.19	1.12	0.54	55.4	620	16.5	"
1748	72	69.65	0.3	21.75	6.19	1.07	0.52	40.5	99	18.0	cloudy
1753	72	69.50	0.3	22.13	6.16	1.02	0.28	33.9	48	19.5	clearing up
1758	72	69.19	0.3	22.27	6.16	1.01	0.18	28.2	45.0	21.0	slightly cloudy
					END						

Instruments (Manufacturer, Model, and Serial No.):

In-Situ SmartTroll # 482717

La Motte 2020we # 6054-4515

Calculations:

Saturated well casing volume: V= Π(R^2)H*7 48 gal/ft^3 $= \pi\left(\frac{1}{12}^2\right)\left(9.09 \times 7.48 \frac{gal}{ft^3}\right) = 1.47 \times 3 = 4.5$

V = Volume (gal/ft)
Π = 3 14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft) = 73.8 - 64.71 = 9.09'

Technician Signature:

Notes:

Recharges well

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/28/2018

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APPENDIX B-8

WATER QUALITY SAMPLING INSTRUMENT CALIBRATION FORMS

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FIELD ENVIRONMENTAL INSTRUMENTS, INC.
www.fieldenvironmental.com

301 Brushton Ave
Suite A
Pittsburgh, PA 15221
Toll Free (800) 393-4009
Local (412) 436-2600
Fax (412) 436-2616

In-Situ SmarTroll Calibration Certificate

Cal Standard	Lot #	Expiration	Pre-Cal Reading	Post-Cal Reading	Acceptable Range
PH 7 @ 25^{C}	7801468	2/29/2020	7.37	7.00	(6.86 to 7.14)

Cal Standard	Lot #	Expiration	Pre-Cal Reading	Post-Cal Reading	Acceptable Range
PH 4 @ 25^{C}	7801545	2/29/2020	4.48	4.00	(3.92 to 4.08)

Cal Standard	Lot #	Expiration	Pre-Cal Reading	Post-Cal Reading	Acceptable Range
PH 10 @ 25^{C}	7712366	1/31/2020	10.12	10.00	(9.80 to 10.20)

Cal Standard	Lot #	Expiration	Pre-Cal Reading	Post-Cal Reading	Acceptable Range
Conductivity	7801537	2/29/2020	1.417	1.409	(1.338 to 1.479)
			Cell Constant	0.990	

ORP Check Standard	User Defined:	Temp ©	Reading	Acceptable Range
	234.0	21.2	217.2	(+/- 2.0mV)

Dissolved Oxygen	Slope:	Offset:	Saturation %	mg/L
	1.07	0	93.3	8.01

Model	SmarTroll Sonde
Ipod SN	DJ6NC1GHFFCJ
Sonde SN	U86391X
Cable SN	487527
Order #	378704

Calibrated By: Allan Miller

Date of Calibration: 9/18/18 JP

*Solutions provided by LabChem (412-826-5230)

All calibrations performed by FEI conform to manufacturer's specifications. Please report any issues within 24 hours of receiving equipment.
All calibration solutions used are traceable to NIST. Additional documentation is available upon request.

FIELD ENVIRONMENTAL INSTRUMENTS, INC.

www.fieldenvironmental.com

301 Brushton Ave
Suite A
Pittsburgh, PA 15221
Toll Free (800) 393-4009
Local (412) 436-2600
Fax (412) 436-2616

Turbidity Meter Calibration Certificate

	Lot #	Exp Date	Reading
0.0 NTU	C800048	9/30/18	0.0
10.0 NTU	C796783	9/30/18	10.0
100 NTU			
750 NTU			
1000 NTU			

Order #	378704
Model	2020we
S/N	6054-4515
Barcode	U82164X

Calibrated By: Allan Miller

Date of Calibration: 9/19/18 DH

All calibrations performed by Field Environmental Instruments conform to manufacturer's specifications.
Any problems must be reported to Field Environmental within 24 hours of receiveing equipment.

FIELD ENVIRONMENTAL INSTRUMENTS, INC.
www.fieldenvironmental.com

301 Brushton Ave
Suite A
Pittsburgh, PA 15221
Toll Free (800) 393-4009
Local (412) 436-2600
Fax (412) 436-2616

In-Situ SmarTroll Calibration Certificate

Cal Standard	Lot #	Expiration	Pre-Cal Reading	Post-Cal Reading	Acceptable Range
PH 7 @ 25^{C}	7801468	2/29/2020	7.53	7.00	(6.86 to 7.14)

Cal Standard	Lot #	Expiration	Pre-Cal Reading	Post-Cal Reading	Acceptable Range
PH 4 @ 25^{C}	7801545	2/29/2020	4.65	4.00	(3.92 to 4.08)

Cal Standard	Lot #	Expiration	Pre-Cal Reading	Post-Cal Reading	Acceptable Range
PH 10 @ 25^{C}	7712366	1/31/2020	10.37	10.00	(9.80 to 10.20)

Cal Standard	Lot #	Expiration	Pre-Cal Reading	Post-Cal Reading	Acceptable Range
Conductivity	7801537	2/29/2020	1.423	1.409	(1.338 to 1.479)
			Cell Constant	0.980	

ORP Check Standard	User Defined:	Temp ©	Reading	Acceptable Range
	233.0	22.0	201.0	(+/- 2.0mV)

Dissolved Oxygen	Slope:	Offset:	Saturation %	mg/L
	0.97	0	100	8.72

Model	SmarTroll Sonde
Ipod SN	C3LKQTRCFFCJ
Sonde SN	U85307X
Cable SN	541331
Order #	378704

Calibrated By: Allan Miller

Date of Calibration: 9/20/18 JP

*Solutions provided by LabChem (412-826-5230)

All calibrations performed by FEI conform to manufacturer's specifications. Please report any issues within 24 hours of receiving equipment.
All calibration solutions used are traceable to NIST. Additional documentation is available upon request.

WATER QUALITY SAMPLING INSTRUMENT CALIBRATION FORM

OTIE — An Oneida ESC Group Company

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186-07-0110
Contract:	FA8903-16-D-0027 Task Order: 0004	Date:	9/20/18
Installation:	Vandenberg AFB	Calibration Start Time:	11:35
Sample Technician:	R. Ofili, M. Wanek	Calibration End Time:	12:35

Readings Before Calibration

Date	Time (24hr)	Temperature (°C)	pH (SU)	Turbidity (NTUs)	Specific Electrical Conductance (mS/cm)	D.O. (%, mg/L)	Salinity (%)	ORP/Eh (mV)	Barometric Pressure (mm Hg)	Comments
9/20/18	11:35	21.63	4.11 7.47 10.33	0.0 8.80 — —	1.37	0.00 Expired RDO cap	N/A	170.2	N/A	RDO cap is expired

Readings After Calibration

Date	Time (24hr)	Temperature (°C)	pH (SU)	Turbidity (NTUs)	Specific Electrical Conductance (mS/cm)	D.O. (%, mg/L)	Salinity (%)	ORP/Eh (mV)	Barometric Pressure (mm Hg)	Comments
9/20/18	11:55	24.33	4.00 7.00 10.00	0.0 9.91 — —	1.41	0.00 Expired RDO cap	N/A	105.9	N/A	RDO cap is expired

Calibration Materials Record:

pH Calibration Standards		
Standard	Cal. Standard Lot #	Expiration Date
pH (4)	G233-01	8-30-19
pH (7)	G250-02	9-13-19
pH (10)	G250-21	3-13-19

Specific Electrical Conductance, Salinity, Dissolved Oxygen (DO) and Oxidation Reduction Potential (ORP) Calibration Standards		
Standard	Cal. Standard Lot #	Expiration Date
Spec. Conductance	G250-17	9-13-19
Salinity	N/A	N/A
D.O.	N/A	N/A
ORP	N/A	N/A

Turbidity Standards		
Standard	Cal. Standard Lot #	Expiration Date
1000	C800048	9/30/18
2010.0	C796783	9/30/18
100	N/A	N/A
800	N/A	N/A

Instruments (Manufacturer, Model, and Serial No.):

	Manufacturer/Model	Serial No.
Water Quality Meter:	In-Situ / Smart Troll Sonde, ~~Durham Geo Slope Indicator~~	U8639LX, ~~1637211~~
Turbidity Meter:	LaMotte / 2020we	6054-4515

Calibrated Within Acceptance Criteria (Y/N): Yes

If No, Provide Explanation

Notes: RDO cap was expired when received, replacement pending.

Technician Signature: (Signature)

Technician Name (print): Rachel Ofili

QA/QC'd by:

QA/QC Date: 9/21/2018

WATER QUALITY SAMPLING INSTRUMENT CALIBRATION FORM

OTIE — An Dinodia ESC Group Company

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07-0110
Contract:	FA8903-16-D-0027 **Task Order:** 0004	**Date:**	9/21/2018
Installation:	Vandenberg AFB	**Calibration Start Time:**	10:30
Sample Technician:	R. Ofili, M. Wanek	**Calibration End Time:**	10:50

Readings Before Calibration

Date	Time (24hr)	Temperature (°C)	pH (SU)	Turbidity (NTUs)	Specific Electrical Conductance (mS/cm)	D.O. (%, mg/L)	Salinity (%)	ORP/Eh (mV)	Barometric Pressure (mm Hg)	Comments
9/21/18	10:30	21.76	7.24	0.38	9.04	8.86	N/A	174.6	N/A	none
			—	8.23						
			—	—						

Readings After Calibration

Date	Time (24hr)	Temperature (°C)	pH (SU)	Turbidity (NTUs)	Specific Electrical Conductance (mS/cm)	D.O. (%, mg/L)	Salinity (%)	ORP/Eh (mV)	Barometric Pressure (mm Hg)	Comments
9/21/18	10:35	22.13	7.00	0.01	7.99	8.86	N/A	227.6	N/A	none
			—	9.94						
			—	—						

Calibration Materials Record:

pH Calibration Standards

Standard	Cal. Standard Lot #	Expiration Date
pH (4)	—	—
pH (7)	25017C	11/25/18
pH (10)	—	—

Specific Electrical Conductance, Salinity, Dissolved Oxygen (DO) and Oxidation Reduction Potential (ORP) Calibration Standards

Standard	Cal. Standard Lot #	Expiration Date
Spec. Conductance	25017C	11/25/18
Salinity	N/A	N/A
D.O	N/A	N/A
ORP	N/A	

Turbidity Standards

Standard	Cal. Standard Lot #	Expiration Date
~~1000~~	C800048	2/30/18
~~10.0~~	C796783	9/30/18
100	N/A	N/A
800	N/A	N/A

Instruments (Manufacturer, Model, and Serial No.):

	Manufacturer/Model	Serial No
Water Quality Meter:	In-Situ / Smar Troll	
Turbidity Meter:	LaMotte / 2020we	6054-4515

Calibrated Within Acceptance Criteria (Y/N): Yes

If No, Provide Explanation:

Notes: None

Technician Signature: (Signature)

Technician Name (print): Rachel Ofili

QA/QC'd by:

QA/QC Date: 9/28/2018

WATER QUALITY SAMPLING INSTRUMENT CALIBRATION FORM

OTIE — An Oneida ESC Group Company

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-17-0110
Contract:	FA8903-16-D-0027 **Task Order:** 0004	**Date:**	09/25/18
Installation:	Vandenberg AFB	**Calibration Start Time:**	12:00
Sample Technician:	R. Ofili, M. Wanek	**Calibration End Time:**	12:20

Readings Before Calibration

Date	Time (24hr)	Temperature (°C)	pH (SU)	Turbidity (NTUs)	Specific Electrical Conductance (mS/cm)	D.O. (%, mg/L)	Salinity (%)	ORP/Eh (mV)	Barometric Pressure (mm Hg)	Comments
9/25/18	12:04	22.0	7.53 4.65 10.37	0.49 0.25	1.42	—	N/A	201.0	N/A	none

Readings After Calibration

Date	Time (24hr)	Temperature (°C)	pH (SU)	Turbidity (NTUs)	Specific Electrical Conductance (mS/cm)	D.O. (%, mg/L)	Salinity (%)	ORP/Eh (mV)	Barometric Pressure (mm Hg)	Comments
9/25/18	12:18	24.2	7.00 4.00 10.00	0.01 9.92	1.41	100% 8.75 mg/L	N/A	201.0	N/A	none

Calibration Materials Record:

pH Calibration Standards

Standard	Cal. Standard Lot #	Expiration Date
pH (4)	7801545	2/29/2020
pH (7)	7801468	2/29/2020
pH (10)	7712364	1/13/2020

Specific Electrical Conductance, Salinity, Dissolved Oxygen (DO) and Oxidation Reduction Potential (ORP) Calibration Standards

Standard	Cal. Standard Lot #	Expiration Date
Spec. Conductance	7801537	2/29/2020
Salinity	N/A	N/A
D.O.	7801468	2/29/2020
ORP	7801468	2/29/2020

Turbidity Standards

Standard	Cal. Standard Lot #	Expiration Date
~~100.0~~	C800048	9/30/18
~~20~~ 10.0	C796783	9/30/18
100	—	—
800	—	—

Instruments (Manufacturer, Model, and Serial No.):

	Manufacturer/Model	Serial No
Water Quality Meter:	Insitu SmarTroll MPSonde	482717
Turbidity Meter:	LaMotte 2020we	6054-4515

Calibrated Within Acceptance Criteria (Y/N): Yes

If No, Provide Explanation:

Notes: None

Technician Signature: (Signature)

Technician Name (print): Rachel Ofili

QA/QC'd by:

QA/QC Date: 9/28/2018

WATER QUALITY SAMPLING INSTRUMENT CALIBRATION FORM

OTIE — An Oneida ESC Group Company

amec foster wheeler

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07-0110
Contract:	FA8903-16-D-0027 Task Order: 0004	Date:	9/26/18
Installation:	Vandenberg AFB	Calibration Start Time:	08:35
Sample Technician:	R. Ofili / M. Wanek	Calibration End Time:	08:55

Readings Before Calibration

Date	Time (24hr)	Temperature (°C)	pH (SU)	Turbidity (NTUs)	Specific Electrical Conductance (mS/cm)	D.O. (%, mg/L)	Salinity (%)	ORP/Eh (mV)	Barometric Pressure (mm Hg)	Comments
9/26/18	08:35	16.34	6.90	0.00	1.51	91.9%	N/A	186.8	N/A	none
			4.84	9.03		8.47		~~N/A~~	~~186.8~~	
			10.08	–						

Readings After Calibration

Date	Time (24hr)	Temperature (°C)	pH (SU)	Turbidity (NTUs)	Specific Electrical Conductance (mS/cm)	D.O. (%, mg/L)	Salinity (%)	ORP/Eh (mV)	Barometric Pressure (mm Hg)	Comments
9/26/18	08:42	17.62	7.02	0.00	1.41	99.1%	N/A	150.9	N/A	none
			4.00	9.95		9.52				
			10.04	–						

Calibration Materials Record:

pH Calibration Standards

Standard	Cal. Standard Lot #	Expiration Date
pH (4)	G163-22	6/22/19
pH (7)	G250-02	9/13/19
pH (10)	G250-21	3/13/19

Specific Electrical Conductance, Salinity, Dissolved Oxygen (DO) and Oxidation Reduction Potential (ORP) Calibration Standards

Standard	Cal. Standard Lot #	Expiration Date
Spec. Conductance	G165-22	6/22/19
Salinity	N/A	N/A
D.O.	G165-~~02~~	6/22/19
ORP	G250-02	9/13/19

Turbidity Standards

Standard	Cal. Standard Lot #	Expiration Date
~~100.0~~	C800048	9/30/18
~~20~~ 10.0	C796783	9/30/18
100	—	—
800	—	—

Instruments (Manufacturer, Model, and Serial No.):

	Manufacturer/Model	Serial No
Water Quality Meter:	InSitu Smart Troll MPSonde	482717
Turbidity Meter:	LaMotte 2020we	6054-4515

Calibrated Within Acceptance Criteria (Y/N): Yes

If No, Provide Explanation:

Notes: none

Technician Signature: (Signature)

Technician Name (print): Rachel Ofili

QA/QC'd by:

QA/QC Date: 9/28/2018

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APPENDIX B-9

GROUNDWATER SAMPLING LOGS

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GROUNDWATER SAMPLING RECORD

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07-0110
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg	Sample Technician:	R. Gill, M. Warek
Well ID:	~~FT~~ 21-MW1	Date:	9/21/18
Initial Depth to Water (ft):	3.41	Well Diameter (in):	2
Total Depth of Well (ft):	13.0	1 Casing Volume (gal):	1.55
Method of Purging:	SS Mega monsoon	3 Casing Volumes (gal):	4.67
Measuring Point (toc, tor, etc.):	GS/TOC	Pump Intake Depth (feet):	9.0

	Time	Water Level (feet)	Flow Rate	Cum. Volume (gal.)	Temp. (°C)	pH (SU)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, odor, etc.)
	Stabilization Criteria				±0.5°C	±0.1	±3%	±10%	±10%	±10% and <10 NTU	
15	3:56	3.41	0.125	0	21.56	6.31	0.69	0.15	3.6	77	H_2S odor, ~~mostly clear~~ milky
16	4:00	3.70	0.125	0.5	21.27	6.19	0.69	0.16	10.7	46	milky
16	4:04	3.70	0.125	1.0	21.24	6.13	0.71	0.18	14.1	63.2	~~hazy~~ cloudy
16	4:08	3.81	0.125	1.5	21.14	6.11	0.72	0.14	16.2	60.7	~~hazy~~ cloudy
16	4:12	3.82	0.125	2.0	21.04	6.09	0.72	0.07	17.5	64.7	~~hazy~~ cloudy
16	4:16	3.83	0.125	2.5	21.21	6.08	0.72	0.05	17.9	64.5	" "
16	4:20	3.89	0.125	3.0	20.77	6.09	0.71	0.01	17.2	64.0	" "
16	4:24	3.93	0.125	3.5	20.63	6.10	0.72	0.03	14.4	49.0	" "
16	4:28	3.83	0.125	4.0	20.54	6.11	0.73	0.06	15.3	74.8	" "
16	4:32	3.90	0.125	4.5	20.55	6.11	0.72	0.04	16.4	72.6	" "
16	4:36	3.83	0.125	5.0	20.53	6.10	0.73	0.01	15.3	77.5	" "
16	4:40	3.64	0.125	5.5	20.85	6.10	0.74	0.02	15.1	37.2	" "
16	4:44	3.80	0.125	6.0	21.00	6.11	0.74	0.03	18.3	23.4	mostly clear
16	4:48	3.76	0.125	6.5	20.92	6.08	0.72	0.01	20.2	15.6	clear
16	4:52	3.72	0.125	7.0	20.96	6.08	0.73	-0.00	17.7	12.3	" "

Stability Reached (Y/N): See pg 2 — If No, Provide Explanation: See pg 2

Final Values: — See pg 2 —

Sample ID:	21-MW1	Method of Sampling:	
QA/QC Samples (Yes/No):	/	Sample Date:	
Duplicate ID:	See pg 2	Sample Collection Time:	
Sample Container Type(s):		Total Volume Purged (gal):	See pg 2
Preservative(s):		Sample Depth (ft):	
Analysis/Method(s):	/	Depth to Water After Sampling (ft):	/

Instruments (Manufacturer, Model, and Serial No.):
In Situ Smar Troll #466238
LaMotte 2020 we turbimeter #6054-4515

Calculations:

Saturated well casing volume: V= Π(R^2)H*7 48 gal/ft^3

V=Volume (gal/ft)
Π = 3 14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

$V = \pi (2^2)(9.59 \times 7.48 \frac{gal}{ft^3}) =$

$H = 9.59'$

Technician Signature: [signature]

Notes: None

Technician Name (print): Mark Warek

QA/QC'd by: [signature] QA/QC Date: 9/28/2018

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OTIE

GROUNDWATER SAMPLING RECORD

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186-
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	VANDENBERG	Sample Technician:	Mark Wanek / R. Ochi
Well ID:	21-MW-1	Date:	9-21-18
Initial Depth to Water (ft):		Well Diameter (in):	
Total Depth of Well (ft):		1 Casing Volume (gal):	
Method of Purging:	pg 1	3 Casing Volumes (gal):	pg 1
Measuring Point (toc, tor, etc.):		Pump Intake Depth (feet):	

	Time	Water Level (feet)	Flow Rate	Cum. Volume (gal.)	Temp. (°C)	pH (SU)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, odor, etc.)
	mw		Stabilization Criteria		±0.5°C	±0.1	±3%	±10%	±10%	±10% and <10 NTU	
16	4:56	3.74	0.125	7.5	20.86	6.09	0.73	0.00	17.7	11.2	" "
17	5:00	3.75	0.125	8.0	20.82	6.08	0.72	0.00	18.0	9.5	" "
17	5:04	3.73	0.125	8.5	20.76	6.09	0.72	0.00	18.2	8.9	" "
17	5:08	3.74	0.125	9.0	20.74	6.08	0.72	0.00	18.3	9.3	" "

Stability Reached (Y/N): mw Yes — If No, Provide Explanation: N/A

Final Values: 20.74 | 6.08 | 0.72 | 0.00 | 18.3 | 9.3

Sample ID:	~~21-MW-1~~ 21-MW-1	Method of Sampling:	Low flow
QA/QC Samples (Yes/No):	~~21-MW-1~~ yes	Sample Date:	9/21/18
Duplicate ID:	DUP-FT021-1	Sample Collection Time:	17:10 DUP: 17:15
Sample Container Type(s):	2x 125 ml	Total Volume Purged (gal):	9.0
Preservative(s):	None	Sample Depth (ft):	9.0
Analysis/Method(s):	EPA	Depth to Water After Sampling (ft):	3.72

Instruments (Manufacturer, Model, and Serial No.):

See pg 1

Calculations:

Saturated well casing volume: V= Π(R^2)H*7 48 gal/ft^3

V=Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

See pg 1

Technician Signature:

Notes:

None

Technician Name (print): Mark Wanek

QA/QC'd by: QA/QC Date: 9/28/2018

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GROUNDWATER SAMPLING RECORD

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07-0110
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Sample Technician:**	R. Ofili / M. Wenek
Well ID:	~~MW~~ 1992FS-MW-1	**Date:**	9/21/18
Initial Depth to Water (ft):	TOC/GS	**Well Diameter (in):**	2
Total Depth of Well (ft):	26.2'	**1 Casing Volume (gal):**	1.5
Method of Purging:	SS Mega Monsoon	**3 Casing Volumes (gal):**	4.4
Measuring Point (toc, tor, etc.):	TOC = ~~TGS~~ Ground Sfce	**Pump Intake Depth (feet):**	22'

Time	Water Level (feet)	Flow Rate gal/min	Cum. Volume (gal.)	Temp. (°C)	pH (SU)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, odor, etc.)
		Stabilization Criteria		±0.5°C	±0.1	±3%	±10%	±10%	±10% and <10 NTU	
1315	17.15	—	—	—	—	—	—	—	—	Initial pre-purge DTW
1336	17.68	0.125	0	21.73	6.83	1.54	4.25 ~~4.25~~	51.4	93	None
1340	18.04	0.125	0.5	20.91	6.75	1.49	4.25	52.5	80.2	None
1344	17.90	0.125	1.0	21.09	6.72	1.48	4.35	52.5	44.4	None
1348	17.90	0.125	1.5	21.23	6.71	1.50	4.32	53.4	34.8	None
1352	17.90	0.125	2.0	21.02	6.71	1.48	4.28	54.3	31.6	None
1356	17.90	0.125	2.5	21.01	6.69	1.47	4.33	56.5	13.9	None
1400	17.92	0.125	3.0	20.85	6.69	1.47	4.24	57.3	9.07	None
1404	17.94	0.125	3.5	20.78	6.68	1.38	4.24	58.6	7.63	None
1408	18.03	0.125	4.0	20.79	6.67	1.36	4.22	59.0	7.69	None
1412	18.04	0.125	4.5	20.78	6.67	1.35	4.20	59.2	7.68	Clear

Stability Reached (Y/N): Y — If No, Provide Explanation: N/A

Final Values: 20.78 | 6.67 | 1.35 | 4.20 | 59.2 | 7.68

Sample ID:	1992FS-~~MW-1~~ MW1	**Method of Sampling:**	Low-Flow
QA/QC Samples (Yes/No):	No	**Sample Date:**	9-21-2018
Duplicate ID:	N/A	**Sample Collection Time:**	1415
Sample Container Type(s):	3x 125mL HDPE jars	**Total Volume Purged (gal):**	4.5
Preservative(s):	None	**Sample Depth (ft):**	22
Analysis/Method(s):	EPA	**Depth to Water After Sampling (ft):**	18.04

Instruments (Manufacturer, Model, and Serial No.):

In-Situ SmartTroll # 466238

Lamotte 2020we turb meter #6054-4515

Calculations:

Saturated well casing volume: V= Π(R^2)H*7 48 gal/ft^3 = 1.47 x 3 = 4.4 gal

V=Volume (gal/ft)
Π = 3 14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft) = 26.2 - 17.15 = 9.05 ft

Technician Signature:

Notes:

Clear, colorless, odorless

Technician Name (print): Mark Wenek

QA/QC'd by:

QA/QC Date: 9/28/2018

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OTIE

GROUNDWATER SAMPLING RECORD

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07-0110
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Sample Technician:**	R. Ofili / M. Warek
Well ID:	1992FS-MW-2	**Date:**	9/21/18
Initial Depth to Water (ft):	~~25~~ 26.91	**Well Diameter (in):**	2
Total Depth of Well (ft):	34.8	**1 Casing Volume (gal):**	1.28
Method of Purging:	SS Mega Monsoon	**3 Casing Volumes (gal):**	3.85
Measuring Point (toc, tor, etc.):	GS / ~~TOC~~	**Pump Intake Depth (feet):**	34.2

	Time	Water Level (feet)	Flow Rate	Cum. Volume (gal.)	Temp. (°C)	pH (SU)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, odor, etc.)
			Stabilization Criteria		±0.5°C	±0.1	±3%	±10%	±10%	±10% and <10 NTU	
14	12:50	26.91	0.125	0	22.34	7.08	3.15	0.21	43.1	>1000	~~initial~~ opaque, ~~pre pump~~ extremely silty
14	12:54	30.50	0.100	0.5	21.71	6.98	3.32	0.64	43.5	>1000	very silty, opaque
14	12:59	30.91	0.100	1.0	22.74	6.93	3.39	0.93	44.9	>1000	" "
15	13:04	top of pump	0.100	1.5	23.13	6.95	3.34	1.04	44.2	>1000	~~drawdown to mach~~ stop / shut off pump
											well pumped dry at lowest setting pump rate

Stability Reached (Y/N): N

If No, Provide Explanation: Slow recharge - well dry before stability reached

Final Values:							

Sample ID:	1992FS-MW1	**Method of Sampling:**	Low flow
QA/QC Samples (Yes/No):	No	**Sample Date:**	9.21.2018
Duplicate ID:	N/A	**Sample Collection Time:**	1835
Sample Container Type(s):	2x 125mL HDPE	**Total Volume Purged (gal):**	1.5 gal
Preservative(s):	None	**Sample Depth (ft):**	29
Analysis/Method(s):	EPA	**Depth to Water After Sampling (ft):**	28.72

Instruments (Manufacturer, Model, and Serial No.):
Smart Trell # 1186391X
LaMotte # 6054-4575

Calculations:

Saturated well casing volume: V= Π(R^2)H*7 48 gal/ft^3

$V = \pi(2^2)\,7.89 \times 7.48 \frac{gal}{ft^3} = 1.28$

V=Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

H= 7.89'

Technician Signature: M-m

Notes: Slow Recharge: In accordance w/ SOP AFW-03 dated 8-3-2018, approx 1 casing volume of H_2O was removed from the well and the well purged dry. Well was allowed to recharge and sampled within 24 hrs

Technician Name (print): Mark Warek

QA/QC'd by: [signature] **QA/QC Date:** 9/28/2018

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OTIE

GROUNDWATER SAMPLING RECORD

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186- 07-0110
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Sample Technician:	R. Ofili / M. Wanek
Well ID:	1992FS - MW3	Date:	9/25/2018
Initial Depth to Water (ft):	26.14	Well Diameter (in):	2
Total Depth of Well (ft):	35.2	1 Casing Volume (gal):	1.47
Method of Purging:	~~Surge, Jetting, Pump~~ SS Monsoon	3 Casing Volumes (gal):	4.42
Measuring Point (toc, tor, etc.):	TOC	Pump Intake Depth (feet):	~~34.6~~ Re 34.6

Time	Water Level (feet)	Flow Rate	Cum. Volume (gal.)	Temp. (°C)	pH (SU)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, odor, etc.)
Stabilization Criteria				±0.5°C	±0.1	±3%	±10%	±10%	±10% and <10 NTU	
12:55	26.14	0.12	0	19.95	6.16	3.88	2.99	117.9	>1000	cloudy
13:00	27.51	0.12	0.6	20.01	6.44	2.88	4.44	109.3	67.0	slightly cloudy
13:05	27.72	0.10	1.1	20.41	6.48	2.81	4.59	107.8	63.9	" "
13:10	28.50	0.10	1.6	20.66	6.56	2.84	5.01	105.6	28.2	clear
13:15	29.31	0.10	2.1	20.65	6.60	2.89	5.05	104.0	14.0	clear
13:20	29.52	0.10	2.6	20.90	6.60	2.99	4.95	103.3	16.5	clear
13:25	29.93	0.10	3.1	21.16	6.59	2.71	5.04	100.1	14.6	clear
13:30	30.39	0.10	3.6	21.25	6.53	2.75	4.73	99.5	13.0	clear
13:35	31.09	0.10	4.1	21.40	6.52	2.73	4.78	100.7	9.28	clear
13:40	30.80	0.10	4.6	21.42	6.51	2.74	4.80	101.0	8.2	clear
13:45	30.67	0.10	5.1	21.45	6.50	2.74	4.82	101.1	8.6	clear
						END				
Final Values:				21.45	6.50	2.74	4.82	101.1	8.6	

Stability Reached (Y/N): Yes If No, Provide Explanation: N/A

Sample ID:	1992FS - MW3	Method of Sampling:	SS Monsoon
QA/QC Samples (Yes/No):	No	Sample Date:	9/25/18
Duplicate ID:	N/A	Sample Collection Time:	13:45
Sample Container Type(s):	2x 125mL HDPE bottles	Total Volume Purged (gal):	5.1
Preservative(s):	none	Sample Depth (ft):	34.6
Analysis/Method(s):	EPA 537	Depth to Water After Sampling (ft):	30.67

Instruments (Manufacturer, Model, and Serial No.):
In-Situ Smartroll MP Sonde #482717 SS Monsoon Pump #6023
LaMotte 2020we #6064-4515

Calculations:
Saturated well casing volume: V= Π(R^2)H*7.48 gal/ft^3

$V = \pi(2^2)9.06 \times 7.48 \frac{gal}{ft^3} = 1.47$ gal $\times 3 =$ 4.42 gal

V=Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

H = 9.06

Technician Signature:

Notes: None

Technician Name (print): Rachel Ofili

QA/QC'd by: QA/QC Date: 9/28/2018

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OTIE

GROUNDWATER SAMPLING RECORD

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186-
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Sample Technician:	R. Ofili / M. Nanek
Well ID:	2006FS - MW -1	Date:	9/26/18
Initial Depth to Water (ft):	66.40	Well Diameter (in):	2
Total Depth of Well (ft):	73.5	1 Casing Volume (gal):	1.15
Method of Purging:	SS Monsoon	3 Casing Volumes (gal):	3.47
Measuring Point (toc, tor, etc.):	TOC / GS	Pump Intake Depth (feet):	72.4, ~~72.3 @ 12:35~~ 67.5 @ 15:10

Time	Water Level (feet)	Flow Rate gal/min	Cum. Volume (gal.)	Temp. (°C)	pH (SU)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, odor, etc.)
		Stabilization Criteria		±0.5°C	±0.1	±3%	±10%	±10%	±10% and <10 NTU	
12:05	66.40	0.1	0	22.57	6.53	1.14	6.59	68.0	23.8	mostly clear
12:10	70.63	0.1	0.5	22.52	6.73	1.16	6.74	65.0	18.6	" "
12:15	71.05	0.1	1.0	22.52	6.62	1.20	6.91	61.3	19.3	" "
12:20	71.30	0.1	1.5	22.81	6.78	1.23	6.82	63.2	22.7	" "
12:25	71.70	0.1	2.0	24.18	6.66	1.31	6.26	60.6	29.0	" "
12:30	72.50	0.1	2.5	25.17	6.60	1.65	5.77	64.2	2073	milky brown
12:35	- well purged dry; needs to recharge									~~pump intake raised to 72.3'~~
15:10	67.27									

Stability Reached (Y/N): No

If No, Provide Explanation: purged dry before parameters could stabilize. Well ~~drew down too quickly~~, parameters failed to stabilize

Final Values:	25.17	6.60	1.65	5.77	64.2	2073

Sample ID:	2006FS-MW1	Method of Sampling:	SS Monsoon
QA/QC Samples (Yes/No):	Duplicate	Sample Date:	7/26/18
Duplicate ID:	DUP1 2006FS-1	Sample Collection Time:	15:15; DUP: 15:20
Sample Container Type(s):	4x 125 mL bottles	Total Volume Purged (gal):	2.5
Preservative(s):	none	Sample Depth (ft):	69.5
Analysis/Method(s):	EPA 537	Depth to Water After Sampling (ft):	~~68.84~~ 67.27

Instruments (Manufacturer, Model, and Serial No.):
InSitu Smart Troll MP Sonde #482717
LaMotte 2020we #6054-4515
Durham Geo Slope Indicator Water Level Indicator #1637211

Calculations:

Saturated well casing volume: V= Π(R^2)H*7.48 gal/ft^3

V=Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

$V = \pi(2^2)\,7.1 \times 7.48 \frac{gal}{ft^3} = 1.15\,gal \times 3 = 3.47\,gal$

H = 7.1'

Technician Signature:

Notes:
* Well drew down dry, parameters failed to statalize*

Technician Name (print): Rachel Ofili

QA/QC'd by:

QA/QC Date: 9/28/2018

Rev. 0, Date: 10/14/2016

Page 1 of 1

* In accordance with SOP AFW-03 dated 8-3-2018, more than 1 casing volume was removed from the well and the well was pumped dry. Well was allowed to recharge and sampled within 24 hrs.

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GROUNDWATER SAMPLING RECORD

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	Project Number:	2016186-
Contract:	FA8903-16-D-0027	Task Order:	0004
Installation:	Vandenberg AFB	Sample Technician:	R. Ofili / M. Wawek
Well ID:	2006FS-MW-2	Date:	9/26/18
Initial Depth to Water (ft):	64.65	Well Diameter (in):	2
Total Depth of Well (ft):	73.8	1 Casing Volume (gal):	1.49
Method of Purging:	SS Monsoon	3 Casing Volumes (gal):	4.47
Measuring Point (toc, tor, etc.):	TOC / GS	Pump Intake Depth (feet):	~~73.0~~ 71.0

Time	Water Level (feet)	Flow Rate gal/min	Cum. Volume (gal.)	Temp. (°C)	pH (SU)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, odor, etc.)
Stabilization Criteria				±0.5°C	±0.1	±3%	±10%	±10%	±10% and <10 NTU	
13:30	64.65	0.2	0	23.05	6.75	1.24	1.77	12.4	1801	brown milky, cloudy
13:35	65.40	0.2	1.0	22.98	6.65	1.29	2.00	10.1	1261	" "
13:40	66.98	0.2	2.0	22.83	6.62	1.28	2.14	9.7	1028	" "
13:45	66.89	0.2	3.0	22.97	6.61	1.26	2.20	8.5	991	" "
13:50	66.91	0.2	4.0	22.29	6.57	1.21	1.69	3.6	675	" "
13:55	66.85	0.2	5.0	23.28	6.56	1.15	1.34	3.3	88	cloudy
14:00	66.85	0.2	6.0	23.21	6.53	1.11	0.93	1.3	61	" "
14:05	66.52	0.2	7.0	23.41	6.55	1.05	0.88	2.8	71.6	" "
14:10	66.40	0.2	8.0	23.46	6.55	1.05	1.26	4.3	55.0	" "
14:15	66.59	0.2	9.0	23.77	6.47	1.04	0.35	-0.8	30.1	" "
14:20	66.93	0.2	10.0	23.87	6.49	1.07	0.73	2.1	41.7	" "
14:25	67.10	0.2	11.0	23.61	6.68	1.14	2.04	7.5	~~21~~ 1880	brown, very turbid
14:30	67.52	0.2	12.0	23.07	6.61	1.18	~~15.8~~ 2.98	19.4	~~71000~~ 2945	" "

Stability Reached (Y/N): N — If No, Provide Explanation: After 1 hour of purging, parameters failed to stabilize

Final Values:	23.07	6.61	1.18	2.98	19.4	~~71000~~ 2945

Sample ID:	2006FS-MW2	Method of Sampling:	SS Monsoon
QA/QC Samples (Yes/No):	MS/MSD	Sample Date:	9/26/18
Duplicate ID:	2006FS-MW2	Sample Collection Time:	14:40
Sample Container Type(s):	6 x 125 mL bottles	Total Volume Purged (gal):	12
Preservative(s):	none	Sample Depth (ft):	~~73.0~~ 71.0
Analysis/Method(s):	EPA 537	Depth to Water After Sampling (ft):	67.52

Instruments (Manufacturer, Model, and Serial No.):
In Situ SmartTroll MP Sonde # 482717
LaMotte 2020we # 6054-4515
Durham Geo Slope Indicator #1637211 Water Level Indicator

Calculations:

Saturated well casing volume: V= Π(R^2)H*7.48 gal/ft^3

$V = \pi (2^2) 9.15 \times 7.48 \frac{gal}{ft^3} = 1.49 gal \times 3 = 4.47 gal$

V=Volume (gal/ft)
Π = 3.14
R = well radius (ft) = (well diameter (in)/12 (in/ft))/2)
H = height of water column (ft)

H = 9.15'

Technician Signature:

Notes: Parameters failed to stabalize after 1 hour of purging, and in accordance w/ SOP AFW-03 dated 8-3-2018, the well was then sampled.

Technician Name (print): Rachel Ofili

QA/QC'd by:

QA/QC Date: 9/28/2018

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APPENDIX B-10

SEDIMENT SAMPLE COLLECTION LOGS

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SAMPLE COLLECTION LOG
SEDIMENT / SURFACE SOIL / SURFACE WATER

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date:**	14 Sept 2018
Location ID:	FT021	**Sample Technician:**	Mark Wanek
Northing:	TBD	**Easting:**	TBD

SURFACE SOIL ~~SEDIMENT~~ SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

(SP-SM) ~~Fine~~ SAND with silt. Light yellowish-brown (10YR, 6/3). Moist. Poorly Graded Loose Fine grained

Sample Depth (ft):	0.0-0.5	**Sample ID:**	21-S14-0.5
MS/MSD Collected:	N	**Sample Date:**	14 Sept 2018
Duplicate ID:	DUP1-FT021-0.5	**Sample Collection Time:**	0840
Sample Container Type(s):	250 mL HDPE jar	**Sample Collection Methods:**	HA
Preservative(s):	None	**Analysis/Method(s):**	EPA 537

SEDIMENT ~~SURFACE SOIL~~ SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

N/A

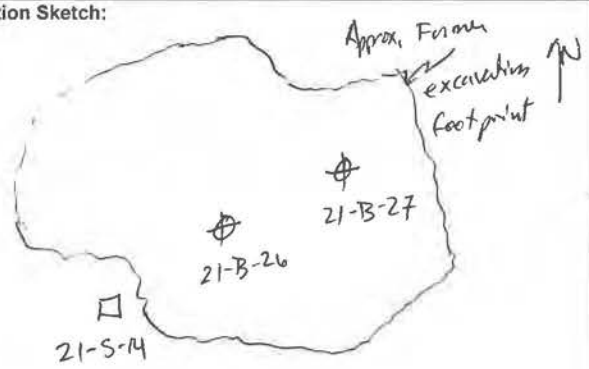
Sample Depth (ft):		**Sample ID:**	
MS/MSD Collected:		**Sample Date:**	
Duplicate ID:		**Sample Collection Time:**	
Sample Container Type(s):		**Sample Collection Methods:**	
Preservative(s):		**Analysis/Method(s):**	

SURFACE WATER SAMPLE

Time	Intake Depth (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations ~~During Purging~~ (color, sediment, etc.)
					N/A			

Sample Depth (ft):		**Sample Date:**	
Sample ID:		**Sample Collection Time:**	
MS/MSD Collected:		**Sample Collection Methods:**	
Duplicate ID:		**Surface Water Depth (ft):**	
Sample Container Type(s):		**Water Body and Water Quality Characteristics** (circle all that apply):	
Preservative(s):		River Stream Pond Flowing Stagnant	
Analysis/Method(s):		Clear Cloudy Turbid Other:	

Location Sketch:



No Scale

Instruments (Manufacturer, Model, and Serial No.):

None

Notes:

None

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

SAMPLE COLLECTION LOG
SEDIMENT / SURFACE SOIL / SURFACE WATER

amec foster wheeler

OTIE

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date:**	14 Sept 2018
Location ID:	FT021	**Sample Technician:**	Mark Wanck
Northing:	TBD	**Easting:**	TBD

SEDIMENT SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

Sample Depth (ft):	N/A	**Sample ID:**	
MS/MSD Collected:		**Sample Date:**	
Duplicate ID:		**Sample Collection Time:**	
Sample Container Type(s):		**Sample Collection Methods:**	
Preservative(s):		**Analysis/Method(s):**	

SURFACE SOIL SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

SP Poorly graded SAND with trace silt. Dry. Loose. Fine grained

Pale brown (10YR 7/2)

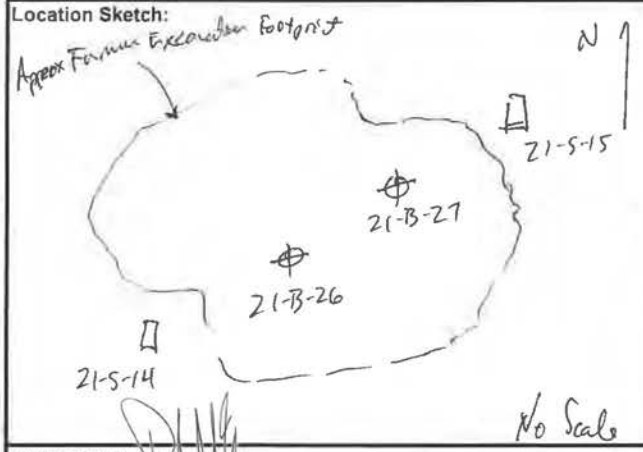
Sample Depth (ft):	0.0-0.5	**Sample ID:**	21-S15-0.5
MS/MSD Collected:	N	**Sample Date:**	14 Sept 2018
Duplicate ID:	N/A	**Sample Collection Time:**	0835
Sample Container Type(s):	250 mL HDPE jar	**Sample Collection Methods:**	NA
Preservative(s):	None	**Analysis/Method(s):**	EPA 537

SURFACE WATER SAMPLE

Time	Intake Depth (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, etc.)
					N/A			

Sample Depth (ft):		**Sample Date:**	
Sample ID:		**Sample Collection Time:**	
MS/MSD Collected:		**Sample Collection Methods:**	
Duplicate ID:		**Surface Water Depth (ft):**	
Sample Container Type(s):		**Water Body and Water Quality Characteristics** (circle all that apply):	
Preservative(s):		River Stream Pond Flowing Stagnant	
Analysis/Method(s):		Clear Cloudy Turbid Other:	

Location Sketch:



Instruments (Manufacturer, Model, and Serial No.):

None

Notes:

None

Technician Signature:

Technician Name (print): Mark Wanck

QA/QC'd by:

QA/QC Date: 9/17/2018

SAMPLE COLLECTION LOG
SEDIMENT / SURFACE SOIL / SURFACE WATER

amec foster wheeler

OTIE

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date:**	14 Sept 2018
Location ID:	FT021	**Sample Technician:**	Mark Wanek
Northing:	TBD	**Easting:**	TBD

SEDIMENT SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

(SP): Poorly graded sand, pale brown (10YR 7/2). Dry, Loose. fine-grained.

Sample Depth (ft):	0.0-0.5	**Sample ID:**	21-SD1-0.5
MS/MSD Collected:	N	**Sample Date:**	14 Sept 2018
Duplicate ID:	N/A	**Sample Collection Time:**	0825
Sample Container Type(s):	250 mL HDPE jar	**Sample Collection Methods:**	HA
Preservative(s):	None	**Analysis/Method(s):**	EPA 537

SURFACE SOIL SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

N/A

Sample Depth (ft):		**Sample ID:**	
MS/MSD Collected:		**Sample Date:**	
Duplicate ID:		**Sample Collection Time:**	
Sample Container Type(s):		**Sample Collection Methods:**	
Preservative(s):		**Analysis/Method(s):**	

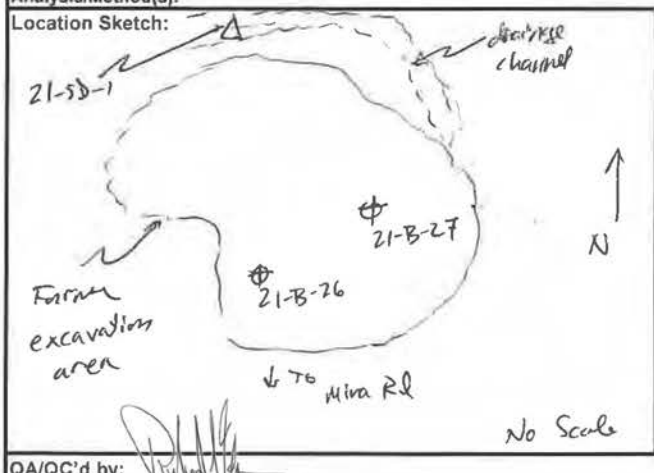
SURFACE WATER SAMPLE

Time	Intake Depth (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, etc.)

N/A

Sample Depth (ft):		**Sample Date:**	
Sample ID:		**Sample Collection Time:**	
MS/MSD Collected:		**Sample Collection Methods:**	
Duplicate ID:		**Surface Water Depth (ft):**	
Sample Container Type(s):	N.	**Water Body and Water Quality Characteristics** (circle all that apply):	
Preservative(s):		River / Stream / Pond / Flowing / Stagnant	
Analysis/Method(s):		Clear / Cloudy / Turbid / Other:	

Location Sketch:



Instruments (Manufacturer, Model, and Serial No.):

None

Notes:

None

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

SNTA

amec foster wheeler

OTIE

SAMPLE COLLECTION LOG
SEDIMENT / SURFACE SOIL / SURFACE WATER

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date:**	9-13-2018
Location ID:	SNTA	**Sample Technician:**	Mark Wheek
Northing:	TBD	**Easting:**	TBD

SEDIMENT SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

SP - Poorly graded SAND, light yellowish-brown (10YR, 6/4), dry-moist, loose

Sample Depth (ft):	0.0-0.5	**Sample ID:**	SNTA-SD1-0.5
MS/MSD Collected:	~~X~~MW N	**Sample Date:**	09-13-2018
Duplicate ID:	DUP4-SNTA-0.5	**Sample Collection Time:**	0950
Sample Container Type(s):	250 mL HDPE jar	**Sample Collection Methods:**	Hand auger
Preservative(s):	None	**Analysis/Method(s):**	EPA 537

SURFACE SOIL SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

N/A

Sample Depth (ft):		**Sample ID:**	
MS/MSD Collected:		**Sample Date:**	
Duplicate ID:		**Sample Collection Time:**	
Sample Container Type(s):		**Sample Collection Methods:**	
Preservative(s):		**Analysis/Method(s):**	

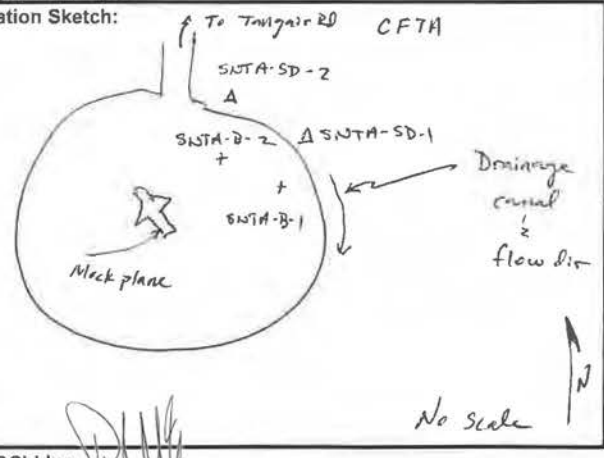
SURFACE WATER SAMPLE

Time	Intake Depth (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, etc.)

NA

Sample Depth (ft):		**Sample Date:**	
Sample ID:		**Sample Collection Time:**	
MS/MSD Collected:		**Sample Collection Methods:**	
Duplicate ID:		**Surface Water Depth (ft):**	
Sample Container Type(s):		**Water Body and Water Quality Characteristics** (circle all that apply):	
Preservative(s):		River Stream Pond Flowing Stagnant	
Analysis/Method(s):		Clear Cloudy Turbid Other:	

Location Sketch:



Instruments (Manufacturer, Model, and Serial No.):

N/A

Notes:

None

Technician Signature: Mark

Technician Name (print): Mark Wheek

QA/QC'd by:

QA/QC Date: 9/17/2018

SNTA

amec foster wheeler

OTIE

SAMPLE COLLECTION LOG
SEDIMENT / SURFACE SOIL / SURFACE WATER

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date:**	9-13-2018
Location ID:	SNTA	**Sample Technician:**	M. Wanek
Northing:	TBD	**Easting:**	TBD

SEDIMENT SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

SM - ~~Poorly graded~~ NW SAND with silt, Brown (10YR, 4/4), Moist, loose
dk yellowish-brown

Sample Depth (ft):	0.0 - 0.5	**Sample ID:**	SNTA-SD2-0.5
MS/MSD Collected:	Y	**Sample Date:**	9.13.2018
Duplicate ID:	N/A	**Sample Collection Time:**	1005
Sample Container Type(s):	3x 250mL HDPE jar	**Sample Collection Methods:**	Hand auger
Preservative(s):	None	**Analysis/Method(s):**	EPA 537

SURFACE SOIL SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

N/A

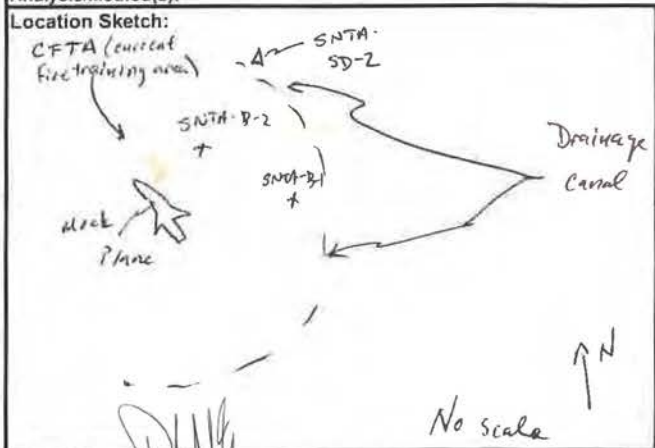
Sample Depth (ft):		**Sample ID:**	
MS/MSD Collected:		**Sample Date:**	
Duplicate ID:		**Sample Collection Time:**	
Sample Container Type(s):		**Sample Collection Methods:**	
Preservative(s):		**Analysis/Method(s):**	

SURFACE WATER SAMPLE

Time	Intake Depth (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, etc.)

Sample Depth (ft):		**Sample Date:**	
Sample ID:		**Sample Collection Time:**	
MS/MSD Collected:		**Sample Collection Methods:**	
Duplicate ID:		**Surface Water Depth (ft):**	
Sample Container Type(s):		**Water Body and Water Quality Characteristics** (circle all that apply):	
Preservative(s):		River Stream Pond Flowing Stagnant	
Analysis/Method(s):		Clear Cloudy Turbid Other:	

Location Sketch:



Instruments (Manufacturer, Model, and Serial No.):

None

Notes:

None

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

SNTA

amec foster wheeler

OTIE

SAMPLE COLLECTION LOG
SEDIMENT / SURFACE SOIL / SURFACE WATER

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date:**	9.13
Location ID:	SNTA	**Sample Technician:**	Mark Wanek
Northing:	TBD	**Easting:**	TBD

SEDIMENT SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

SP. Poorly GRADED SAND (SP). Light yellowish brown (10YR, 7/3), moist, loose

Sample Depth (ft):	0.0 - 0.5	**Sample ID:**	SNTA-SD3-0.5
MS/MSD Collected:	N	**Sample Date:**	9.13.18
Duplicate ID:	N/A	**Sample Collection Time:**	1100
Sample Container Type(s):	250 mL HDPE	**Sample Collection Methods:**	Hand Auger
Preservative(s):	None	**Analysis/Method(s):**	EPA 537

SURFACE SOIL SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

N/A

Sample Depth (ft):		**Sample ID:**	
MS/MSD Collected:		**Sample Date:**	
Duplicate ID:		**Sample Collection Time:**	
Sample Container Type(s):		**Sample Collection Methods:**	
Preservative(s):		**Analysis/Method(s):**	

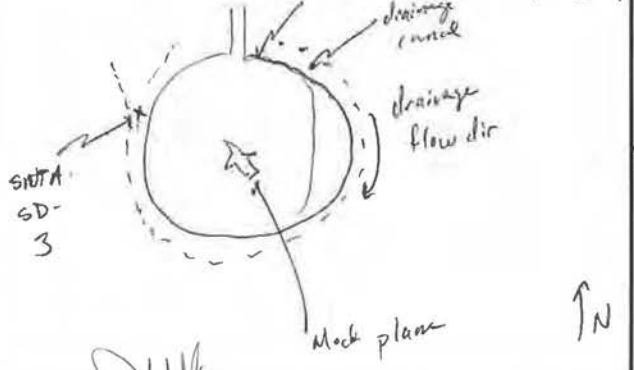
SURFACE WATER SAMPLE

Time	Intake Depth (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, etc.)

N/A

Sample Depth (ft):		**Sample Date:**	
Sample ID:		**Sample Collection Time:**	
MS/MSD Collected:		**Sample Collection Methods:**	
Duplicate ID:		**Surface Water Depth (ft):**	
Sample Container Type(s):		**Water Body and Water Quality Characteristics** (circle all that apply):	
Preservative(s):		River Stream Pond Flowing Stagnant	
Analysis/Method(s):		Clear Cloudy Turbid Other:	

Location Sketch:



Instruments (Manufacturer, Model, and Serial No.):

N/A

Notes:

None

Technician Signature:

Technician Name (print): Mark Wanek

QA/QC'd by:

QA/QC Date: 9/17/2018

SAMPLE COLLECTION LOG
SEDIMENT / SURFACE SOIL / SURFACE WATER

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186- 07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date:**	14 Sept 2018
Location ID:	2006 Fuel Spill	**Sample Technician:**	Mark Warnek
Northing:	TBD	**Easting:**	TBD

SEDIMENT SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

Silty SAND (SM) Pale brown (10YR 7/2), dry, loose

Sample Depth (ft):	0.0 - 0.5	**Sample ID:**	2006FS-SD1-0.5
MS/MSD Collected:	N	**Sample Date:**	14 Sept 2018
Duplicate ID:	NA	**Sample Collection Time:**	1430
Sample Container Type(s):	250 mL HDPE jar	**Sample Collection Methods:**	HA
Preservative(s):	None	**Analysis/Method(s):**	EPA 537

SURFACE SOIL SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

Sample Depth (ft):	N/A	**Sample ID:**	
MS/MSD Collected:		**Sample Date:**	
Duplicate ID:		**Sample Collection Time:**	
Sample Container Type(s):		**Sample Collection Methods:**	
Preservative(s):		**Analysis/Method(s):**	

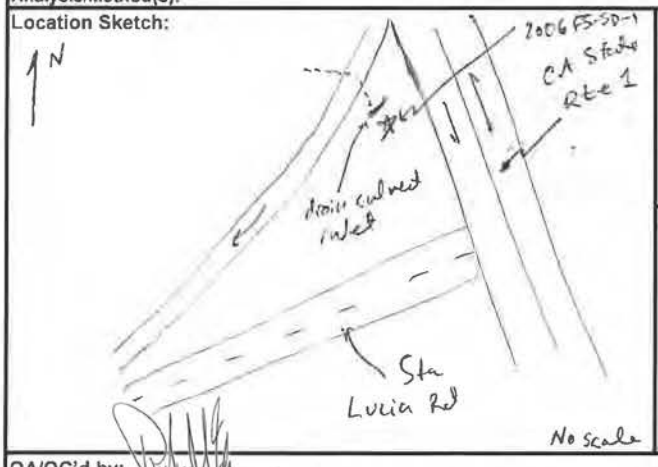
SURFACE WATER SAMPLE

Time	Intake Depth (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, etc.)

N/A

Sample Depth (ft):		**Sample Date:**	
Sample ID:		**Sample Collection Time:**	
MS/MSD Collected:		**Sample Collection Methods:**	
Duplicate ID:		**Surface Water Depth (ft):**	
Sample Container Type(s):		**Water Body and Water Quality Characteristics** (circle all that apply):	
Preservative(s):		River Stream Pond Flowing Stagnant	
Analysis/Method(s):		Clear Cloudy Turbid Other:	

Location Sketch:



Instruments (Manufacturer, Model, and Serial No.):

None

Notes:

None

Technician Signature:

Technician Name (print): Mark Warnek

QA/QC'd by:

QA/QC Date: 9/17/2018

SAMPLE COLLECTION LOG
SEDIMENT / SURFACE SOIL / SURFACE WATER

Project Name:	Site Inspection of AFFF Release Areas Environmental Programs Worldwide	**Project Number:**	2016186-07
Contract:	FA8903-16-D-0027	**Task Order:**	0004
Installation:	Vandenberg AFB	**Date:**	14 Sept 2018
Location ID:	2006 Fuel Spill	**Sample Technician:**	Mark Wanek
Northing:	TBD	**Easting:**	TBD

SEDIMENT SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

SM (Silty Sand). Pale brown (10YR 7/2). Dry. Loose

Sample Depth (ft):	0.0 - 0.5	**Sample ID:**	2006FS-SD2-0.5
MS/MSD Collected:	N	**Sample Date:**	14-Sept 2018
Duplicate ID:	N/A	**Sample Collection Time:**	1440
Sample Container Type(s):	250 mL HDPE jar	**Sample Collection Methods:**	HA
Preservative(s):	None	**Analysis/Method(s):**	EPA 537

SURFACE SOIL SAMPLE

Description

NAME (USCS Symbol): color, moisture, % by wt, plasticity, dilatancy, toughness, dry strength,consistency

N/A

Sample Depth (ft):		**Sample ID:**	
MS/MSD Collected:		**Sample Date:**	
Duplicate ID:		**Sample Collection Time:**	
Sample Container Type(s):		**Sample Collection Methods:**	
Preservative(s):		**Analysis/Method(s):**	

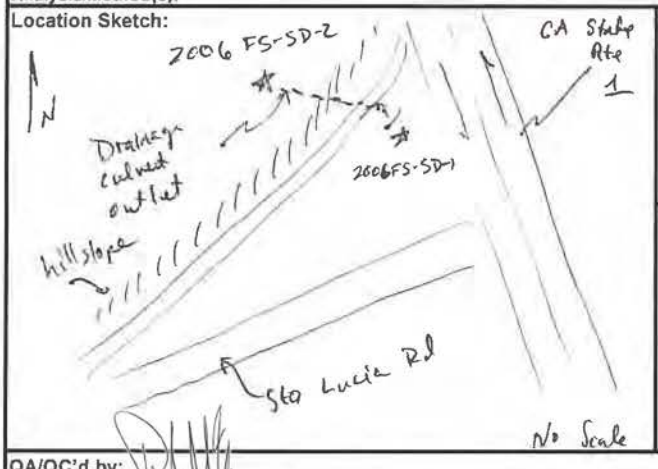
SURFACE WATER SAMPLE

Time	Intake Depth (feet)	Temp. (°C)	pH (units)	Specific Electrical Conductance (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Comments/Observations During Purging (color, sediment, etc.)

N/A

Sample Depth (ft):		**Sample Date:**	
Sample ID:		**Sample Collection Time:**	
MS/MSD Collected:		**Sample Collection Methods:**	
Duplicate ID:		**Surface Water Depth (ft):**	
Sample Container Type(s):		**Water Body and Water Quality Characteristics** (circle all that apply):	
Preservative(s):		River / Stream / Pond / Flowing / Stagnant	
Analysis/Method(s):		Clear / Cloudy / Turbid / Other:	

Location Sketch:



Instruments (Manufacturer, Model, and Serial No.):

None

Notes:

None

Technician Signature:

Mark Wanek

Technician Name (print): Mark Wanek

QA/QC'd by: [signature] **QA/QC Date:** 9/17/2018

APPENDIX C

LABORATORY ANALYTICAL REPORTS

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Maxxam
A Bureau Veritas Group Company

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/05
Report #: R5429567
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6743
Received: 2018/09/20, 14:06

Sample Matrix: Soil
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Moisture	8	N/A	2018/09/22	CAM SOP-00445	Carter 2nd ed 51.2 m
PFOS and PFOA in soil by SPE/LCMS (1)	8	2018/09/24	2018/09/30	CAM SOP-00894	EPA537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/05
Report #: R5429567
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6743
Received: 2018/09/20, 14:06

Encryption Key

Stephanie Pollen
Project Manager
05 Oct 2018 16:18:07

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Stephanie Pollen, Project Manager
Email: SPollen@maxxam.ca
Phone# (905) 817-5700
==========
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8O6743
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR130				HUR131				HUR132				
Sampling Date		2018/09/14 08:40				2018/09/14 08:30				2018/09/14 08:35				
COC Number		na				na				na				
	UNITS	**21-S14-0.5**	**DL**	**LOD**	**LOQ**	**DUP1-FT021-0.5**	**DL**	**LOD**	**LOQ**	**21-S15-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics														
Moisture	%	1.7	0.50	N/A	1.0	1.6	0.50	N/A	1.0	2.4	0.50	N/A	1.0	5746345
Miscellaneous Parameters														
6:2 Fluorotelomer sulfonate	ug/kg	0.70 U	0.23	0.70	0.88	0.64 U	0.21	0.64	0.80	3.5	0.23	0.72	0.90	5747190
8:2 Fluorotelomer sulfonate	ug/kg	0.70 U	0.29	0.70	0.88	0.64 U	0.26	0.64	0.80	6.9	0.30	0.72	0.90	5747190
EtFOSAA	ug/kg	0.44 U	0.13	0.44	0.88	0.40 U	0.12	0.40	0.80	0.45 U	0.14	0.45	0.90	5747190
MeFOSAA	ug/kg	0.70 U	0.23	0.70	0.88	0.64 U	0.21	0.64	0.80	0.72 U	0.23	0.72	0.90	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	1.0	0.15	0.44	0.88	0.91	0.14	0.40	0.80	0.84 J	0.15	0.45	0.90	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	0.70 U	0.25	0.70	0.88	0.64 U	0.22	0.64	0.80	0.82 J	0.25	0.72	0.90	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.74 U	0.26	0.74	0.92	0.61 U	0.21	0.61	0.76	0.72 U	0.25	0.72	0.90	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.43 J	0.17	0.44	0.88	0.40 J	0.15	0.40	0.80	0.94	0.17	0.45	0.90	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	6.6	0.21	0.44	0.88	7.0	0.19	0.40	0.80	22	0.22	0.45	0.90	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	3.7	0.12	0.44	0.88	2.7	0.11	0.40	0.80	3.1	0.13	0.45	0.90	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	3.7	0.22	0.70	0.88	3.8	0.20	0.64	0.80	5.9	0.23	0.72	0.90	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	0.38 J	0.19	0.44	0.88	0.41 J	0.18	0.40	0.80	1.2	0.20	0.45	0.90	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	17	0.23	0.70	0.88	16	0.21	0.64	0.80	110 (1)	2.3	7.2	9.0	5747190
Perfluorotetradecanoic Acid	ug/kg	0.70 U	0.27	0.70	0.88	0.64 U	0.25	0.64	0.80	0.72 U	0.28	0.72	0.90	5747190
Perfluorotridecanoic Acid	ug/kg	0.70 U	0.29	0.70	0.88	0.64 U	0.26	0.64	0.80	0.61 J	0.30	0.72	0.90	5747190
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.70 U	0.30	0.70	0.88	0.64 U	0.27	0.64	0.80	1.3	0.31	0.72	0.90	5747190
Surrogate Recovery (%)														
13C2-6:2 Fluorotelomer sulfonate	%	68				77				77				5747190
13C2-8:2 Fluorotelomer sulfonate	%	72				74				78				5747190
13C2-Perfluorodecanoic acid	%	77				76				74				5747190
13C2-Perfluorododecanoic acid	%	56				81				84				5765332
13C2-Perfluorohexanoic acid	%	76				78				78				5747190
13C2-perfluorotetradecanoic acid	%	60				64				66				5747190
13C2-Perfluoroundecanoic acid	%	64				71				73				5747190
13C4-Perfluoroheptanoic acid	%	76				82				79				5747190
13C4-Perfluorooctanesulfonate	%	73				80				86				5747190
13C4-Perfluorooctanoic acid	%	72				79				78				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (10x).

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Maxxam Job #: B8O6743
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR130				HUR131				HUR132				
Sampling Date		2018/09/14 08:40				2018/09/14 08:30				2018/09/14 08:35				
COC Number		na				na				na				
	UNITS	**21-S14-0.5**	**DL**	**LOD**	**LOQ**	**DUP1-FT021-0.5**	**DL**	**LOD**	**LOQ**	**21-S15-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C5-Perfluorononanoic acid	%	75				80				79				5747190
18O2-Perfluorohexanesulfonate	%	79				85				80				5747190
D3-MeFOSAA	%	66				72				69				5747190
D5-EtFOSAA	%	68				70				68				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6743
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR133					HUR134				
Sampling Date		2018/09/10 10:15					2018/09/10 13:15				
COC Number		na					na				
	UNITS	**21-B26-4.0**	**DL**	**LOD**	**LOQ**	**QC Batch**	**21-B27-8.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics											
Moisture	%	35	0.50	N/A	1.0	5746345	37	0.50	N/A	1.0	5746345
Miscellaneous Parameters											
6:2 Fluorotelomer sulfonate	ug/kg	3.6	0.34	1.0	1.3	5747190	2.3	0.39	1.2	1.5	5747190
8:2 Fluorotelomer sulfonate	ug/kg	23	0.43	1.0	1.3	5747190	28	0.50	1.2	1.5	5747190
EtFOSAA	ug/kg	0.65 U	0.20	0.65	1.3	5747190	0.75 U	0.23	0.75	1.5	5747190
MeFOSAA	ug/kg	1.0 U	0.34	1.0	1.3	5747190	1.2 U	0.39	1.2	1.5	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.51 J	0.22	0.65	1.3	5747190	0.30 J	0.26	0.75	1.5	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	1.0 U	0.36	1.0	1.3	5747190	0.54 J	0.42	1.2	1.5	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.96 U	0.34	0.96	1.2	5765332	1.1 U	0.39	1.1	1.4	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	1.3	0.25	0.65	1.3	5747190	0.86 J	0.29	0.75	1.5	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	16	0.31	0.65	1.3	5747190	8.5	0.36	0.75	1.5	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	4.6	0.18	0.65	1.3	5747190	2.3	0.21	0.75	1.5	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	6.5	0.33	1.0	1.3	5747190	2.9	0.38	1.2	1.5	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	1.7	0.29	0.65	1.3	5747190	0.67 J	0.33	0.75	1.5	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	190 (1)	3.4	10	13	5747190	56	0.39	1.2	1.5	5747190
Perfluorotetradecanoic Acid	ug/kg	0.96 U	0.37	0.96	1.2	5765332	1.2 U	0.47	1.2	1.5	5747190
Perfluorotridecanoic Acid	ug/kg	0.96 U	0.40	0.96	1.2	5765332	1.2 U	0.50	1.2	1.5	5747190
Perfluoroundecanoic Acid (PFUnA)	ug/kg	1.0 U	0.44	1.0	1.3	5747190	1.2 U	0.51	1.2	1.5	5747190
Surrogate Recovery (%)											
13C2-6:2 Fluorotelomer sulfonate	%	78				5747190	80				5747190
13C2-8:2 Fluorotelomer sulfonate	%	74				5747190	71				5747190
13C2-Perfluorodecanoic acid	%	65				5747190	75				5747190
13C2-Perfluorododecanoic acid	%	75				5765332	86				5765332
13C2-Perfluorohexanoic acid	%	75				5747190	78				5747190
13C2-perfluorotetradecanoic acid	%	56				5765332	57				5747190
13C2-Perfluoroundecanoic acid	%	59				5747190	68				5747190
13C4-Perfluoroheptanoic acid	%	76				5747190	79				5747190
13C4-Perfluorooctanesulfonate	%	95				5747190	73				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (10x).

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Maxxam Job #: B8O6743
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR133					HUR134				
Sampling Date		2018/09/10 10:15					2018/09/10 13:15				
COC Number		na					na				
	UNITS	**21-B26-4.0**	**DL**	**LOD**	**LOQ**	**QC Batch**	**21-B27-8.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanoic acid	%	75				5747190	77				5747190
13C5-Perfluorononanoic acid	%	75				5747190	80				5747190
18O2-Perfluorohexanesulfonate	%	73				5747190	72				5747190
D3-MeFOSAA	%	55				5747190	62				5747190
D5-EtFOSAA	%	51				5747190	61				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6743
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR135					HUR136				
Sampling Date		2018/09/13 13:25					2018/09/13 14:30				
COC Number		na					na				
	UNITS	**21-B28-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**	**21-B28-19**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics											
Moisture	%	0.70 J	0.50	N/A	1.0	5746345	34	0.50	N/A	1.0	5746345
Miscellaneous Parameters											
6:2 Fluorotelomer sulfonate	ug/kg	120 (1)	2.3	7.0	8.8	5747190	1.1 U	0.36	1.1	1.4	5747190
8:2 Fluorotelomer sulfonate	ug/kg	440 (1)	2.9	7.0	8.8	5747190	1.1 U	0.46	1.1	1.4	5747190
EtFOSAA	ug/kg	4.5 J (1)	1.3	4.4	8.8	5747190	0.70 U	0.21	0.70	1.4	5747190
MeFOSAA	ug/kg	5.4 J (1)	2.3	7.0	8.8	5747190	1.1 U	0.36	1.1	1.4	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	2.8 J (1)	1.5	4.4	8.8	5747190	0.41 J	0.24	0.70	1.4	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	8.8 (1)	2.5	7.0	8.8	5747190	1.1 U	0.39	1.1	1.4	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	5.4 J (2)	2.5	7.1	8.9	5765332	1.2 U	0.42	1.2	1.5	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	6.6 J (1)	1.7	4.4	8.8	5747190	0.70 U	0.27	0.70	1.4	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	45 (1)	2.1	4.4	8.8	5747190	0.70 U	0.34	0.70	1.4	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	31 (1)	1.2	4.4	8.8	5747190	1.4	0.20	0.70	1.4	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	14 (1)	2.2	7.0	8.8	5747190	1.1 U	0.35	1.1	1.4	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	4.7 J (1)	1.9	4.4	8.8	5747190	0.70 U	0.31	0.70	1.4	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	550 (3)	23	70	88	5747190	1.1 U	0.36	1.1	1.4	5747190
Perfluorotetradecanoic Acid	ug/kg	7.0 U (1)	2.7	7.0	8.8	5747190	1.2 U	0.47	1.2	1.5	5765332
Perfluorotridecanoic Acid	ug/kg	8.6 J (1)	2.9	7.0	8.8	5747190	1.2 U	0.50	1.2	1.5	5765332
Perfluoroundecanoic Acid (PFUnA)	ug/kg	34 (1)	3.0	7.0	8.8	5747190	1.1 U	0.48	1.1	1.4	5747190
Surrogate Recovery (%)											
13C2-6:2 Fluorotelomer sulfonate	%	82				5747190	70				5747190
13C2-8:2 Fluorotelomer sulfonate	%	76				5747190	66				5747190
13C2-Perfluorodecanoic acid	%	81				5747190	60				5747190
13C2-Perfluorododecanoic acid	%	95				5765332	87				5765332
13C2-Perfluorohexanoic acid	%	84				5747190	69				5747190
13C2-perfluorotetradecanoic acid	%	82				5747190	86				5765332

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly (10x).
(2) Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.
(3) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (100x).

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Maxxam Job #: B8O6743
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR135					HUR136				
Sampling Date		2018/09/13 13:25					2018/09/13 14:30				
COC Number		na					na				
	UNITS	**21-B28-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**	**21-B28-19**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C2-Perfluoroundecanoic acid	%	86				5747190	54				5747190
13C4-Perfluoroheptanoic acid	%	84				5747190	71				5747190
13C4-Perfluorooctanesulfonate	%	81				5747190	67				5747190
13C4-Perfluorooctanoic acid	%	82				5747190	67				5747190
13C5-Perfluorononanoic acid	%	84				5747190	70				5747190
18O2-Perfluorohexanesulfonate	%	88				5747190	70				5747190
D3-MeFOSAA	%	85				5747190	57				5747190
D5-EtFOSAA	%	86				5747190	54				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8O6743
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR137				
Sampling Date		2018/09/14 08:25				
COC Number		na				
	UNITS	**21-SD1-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics						
Moisture	%	6.0	0.50	N/A	1.0	5746345
Miscellaneous Parameters						
6:2 Fluorotelomer sulfonate	ug/kg	0.71 U	0.23	0.71	0.89	5747190
8:2 Fluorotelomer sulfonate	ug/kg	0.71 U	0.29	0.71	0.89	5747190
EtFOSAA	ug/kg	0.45 U	0.13	0.45	0.89	5747190
MeFOSAA	ug/kg	0.71 U	0.23	0.71	0.89	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.45 U	0.15	0.45	0.89	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	0.67 J	0.25	0.71	0.89	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.73 U	0.25	0.73	0.91	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.46 J	0.17	0.45	0.89	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	2.1	0.21	0.45	0.89	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	1.0	0.12	0.45	0.89	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	0.66 J	0.22	0.71	0.89	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	0.33 J	0.20	0.45	0.89	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	12	0.23	0.71	0.89	5747190
Perfluorotetradecanoic Acid	ug/kg	0.71 U	0.28	0.71	0.89	5747190
Perfluorotridecanoic Acid	ug/kg	0.46 J	0.29	0.71	0.89	5747190
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.54 J	0.30	0.71	0.89	5747190
Surrogate Recovery (%)						
13C2-6:2 Fluorotelomer sulfonate	%	77				5747190
13C2-8:2 Fluorotelomer sulfonate	%	73				5747190
13C2-Perfluorodecanoic acid	%	71				5747190
13C2-Perfluorododecanoic acid	%	81				5765332
13C2-Perfluorohexanoic acid	%	73				5747190
13C2-perfluorotetradecanoic acid	%	55				5747190
13C2-Perfluoroundecanoic acid	%	64				5747190
13C4-Perfluoroheptanoic acid	%	77				5747190
13C4-Perfluorooctanesulfonate	%	69				5747190
13C4-Perfluorooctanoic acid	%	74				5747190
13C5-Perfluorononanoic acid	%	75				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6743
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR137				
Sampling Date		2018/09/14 08:25				
COC Number		na				
	UNITS	**21-SD1-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
18O2-Perfluorohexanesulfonate	%	76				5747190
D3-MeFOSAA	%	59				5747190
D5-EtFOSAA	%	57				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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TEST SUMMARY

Maxxam ID: HUR130 **Collected:** 2018/09/14
Sample ID: 21-S14-0.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR131 **Collected:** 2018/09/14
Sample ID: DUP1-FT021-0.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR132 **Collected:** 2018/09/14
Sample ID: 21-S15-0.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR133 **Collected:** 2018/09/10
Sample ID: 21-B26-4.0 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR134 **Collected:** 2018/09/10
Sample ID: 21-B27-8.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR135 **Collected:** 2018/09/13
Sample ID: 21-B28-0.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

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TEST SUMMARY

Maxxam ID: HUR136
Sample ID: 21-B28-19
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR137
Sample ID: 21-SD1-0.5
Matrix: Soil

Collected: 2018/09/14
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.5°C

Sample HUR130, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR131, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR132, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR133, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR134, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR135, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR136, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR137, PFOS and PFOA in soil by SPE/LCMS: Test repeated.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5746345	NB3	RPD - Sample/Sample Dup	Moisture	2018/09/22	1.3		%	20
5747190	M_G	Matrix Spike	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		76	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		70	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		72	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		76	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		62	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		65	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		76	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		74	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		74	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		78	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		79	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		106	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		114	%	70 - 130
			D3-MeFOSAA	2018/09/30		66	%	50 - 150
			D5-EtFOSAA	2018/09/30		65	%	50 - 150
			EtFOSAA	2018/09/30		104	%	70 - 130
			MeFOSAA	2018/09/30		107	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		110	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		109	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		106	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		113	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		118	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		116	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		109	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		106	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		109	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		111	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		104	%	70 - 130
5747190	M_G	Matrix Spike DUP	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		68	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		65	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		67	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		74	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		59	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		65	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		73	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		67	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		72	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		70	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		76	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		111	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		115	%	70 - 130
			D3-MeFOSAA	2018/09/30		57	%	50 - 150
			D5-EtFOSAA	2018/09/30		57	%	50 - 150
			EtFOSAA	2018/09/30		111	%	70 - 130
			MeFOSAA	2018/09/30		114	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		114	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		120	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		118	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		114	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		119	%	70 - 130

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Oneida Total Integrated Enterprises
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Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		120	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		115	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		110	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		112	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		115	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		117	%	70 - 130
5747190	M_G	MS/MSD RPD	6:2 Fluorotelomer sulfonate	2018/09/30	5.3		%	30
			8:2 Fluorotelomer sulfonate	2018/09/30	0.35		%	30
			EtFOSAA	2018/09/30	7.3		%	30
			MeFOSAA	2018/09/30	6.7		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/09/30	3.8		%	30
			Perfluorodecanoic Acid (PFDA)	2018/09/30	8.9		%	30
			Perfluorononanoic Acid (PFNA)	2018/09/30	10		%	30
			Perfluorotetradecanoic Acid	2018/09/30	0.70		%	30
			Perfluorotridecanoic Acid	2018/09/30	0.76		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30	3.3		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30	5.3		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30	4.2		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/09/30	2.3		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30	2.7		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/09/30	12		%	30
5747190	M_G	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		76	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		74	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		76	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		80	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		65	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		70	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		81	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		70	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		78	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		78	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		79	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		110	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		112	%	70 - 130
			D3-MeFOSAA	2018/09/30		67	%	50 - 150
			D5-EtFOSAA	2018/09/30		62	%	50 - 150
			EtFOSAA	2018/09/30		112	%	70 - 130
			MeFOSAA	2018/09/30		108	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		116	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		112	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		115	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		118	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		116	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		118	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		114	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		112	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		111	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		111	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		117	%	70 - 130
5747190	M_G	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		72	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		61	%	50 - 150

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C2-Perfluorodecanoic acid	2018/09/30		59	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		70	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		51	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		52	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		70	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		61	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		68	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		63	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		68	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			8:2 Fluorotelomer sulfonate	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			D3-MeFOSAA	2018/09/30		55	%	50 - 150
			D5-EtFOSAA	2018/09/30		53	%	50 - 150
			EtFOSAA	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			MeFOSAA	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorobutane Sulfonate (PFBS)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorodecanoic Acid (PFDA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorononanoic Acid (PFNA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorotetradecanoic Acid	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorotridecanoic Acid	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorohexanoic Acid (PFHxA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorooctane Sulfonate (PFOS)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
5765332	JDA	Matrix Spike(HUR132)	13C2-Perfluorododecanoic acid	2018/10/04		125	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		112	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		114	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		119	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/04		116	%	70 - 130
5765332	JDA	Matrix Spike DUP(HUR132)	13C2-Perfluorododecanoic acid	2018/10/04		108	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		112	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		133 (1)	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		127	%	70 - 130
5765332	JDA	MS/MSD RPD	Perfluorododecanoic Acid (PFDoA)	2018/10/04	15 (1)		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorotetradecanoic Acid	2018/10/04	6.5		%	30
5765332	JDA	Spiked Blank	13C2-Perfluorododecanoic acid	2018/10/04		77	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		82	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		118	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		118	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/04		111	%	70 - 130
5765332	JDA	Method Blank	13C2-Perfluorododecanoic acid	2018/10/04		84	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		82	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluorotetradecanoic Acid	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluorotridecanoic Acid	2018/10/04	0.80 U, LOD=0.80		ug/kg	

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery of the matrix spike was above the upper control limit. Laboratory spiked soil resulted in satisfactory recovery of the compound of interest. When considered together, these QC data suggest that matrix interferences may be biasing the data high. For results that were not detected (ND), this potential bias has no impact.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere, Scientific Service Specialist

Sin Chii Chia, Scientific Services

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Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

AIR OTIE
An Oneida Nation Company

Maxxam Analytics

FT021

CHAIN OF CUSTODY RECORD

DATE: 17 SEPT 2018
PAGE: 1 OF 1

LABORATORY CLIENT: OTIE	CLIENT PROJECT NAME / NUMBER: Vandenberg ~~Travis~~ AFB ~~2015341-10-1004~~ 20161860 7
ADDRESS: ~~1777 N. California Blvd., Suite 310~~ 317 E. MAIN ST	P.O. NO.: ~~40995~~
CITY: Ventura ~~Walnut Creek~~ STATE: CA ZIP: 94596	PROJECT CONTACT: Oscar Martinez / Emmanuel Vasquez
E-MAIL: Omartinez@otie.com EVasquez ~~MQuillin~~@otie.com	LAB CONTACT / QUOTE NO.: Stephanie Pollen / B64666
TEL: ~~925-906-9696~~ 805-585-2115 FAX: ~~925-906-9678~~ 805-585-2111	SAMPLER(S) (SIGNATURE):
	SDG #

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
- OTIE specific EDDs
- level III data package ~~unless otherwise noted~~

REQUESTED ANALYSIS

Relinquished by commercial carrier: Fed Ex

Preservation Codes: H = HCl, N = HNO_3, S = H_2SO_4, NA = Not Applicable, T = Trizma, B = NaOH

Lab Use	SAMPLE ID	SAMPLING DATE	TIME	MATRIX	GRAB	COMP.	No. of containers	PFAS EPA 537 Modified	MS/MSD										MA (Transfer)	Remarks
	21-S14-0.5	9.14.18	0840	SO			1	X											✓	
	DUP1-FT021-0.5	9.14.18	0830	SO			1	X											✓	
	21-S15-0.5	9.14.18	0835	SO			1	X											✓	
	21-B26-4.0	9.10.18	1015	SO			1	X											✓	
	21-B27-8.5	9.10.18	1315	SO			1	X											✓	
	21-B28-0.5	9.13.18	1325	SO			1	X											✓	
	21-B28-19	9.13.18	1430	SO			1	X											✓	
	21-SD1-0.5	9.14.18	0825	SO			1	X											✓	

Relinquished by (Signature)	Received by (Signature)	Date	Time
		9.17.18	1630
Relinquished by (Signature)	Received by (Signature): FRANCINE CHONG	2018/9/20	14:06
Relinquished by (Signature)	Received by (Signature)		

20-Sep-18 14:06
Stephanie Pollen
B8O6743

5.0/3.9/4.5

J_L ENV-994

International Solid Sample
Heat Treat Required
High Risk material
Controlled Storage and Disposal

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/05
Report #: R5429568
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6750
Received: 2018/09/20, 14:06

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Moisture	4	N/A	2018/09/22	CAM SOP-00445	Carter 2nd ed 51.2 m
PFOS and PFOA in soil by SPE/LCMS (1)	4	2018/09/24	2018/09/30	CAM SOP-00894	EPA537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/05
Report #: R5429568
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6750
Received: 2018/09/20, 14:06

Encryption Key

Stephanie Pollen
Project Manager
05 Oct 2018 16:26:48

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Stephanie Pollen, Project Manager
Email: SPollen@maxxam.ca
Phone# (905) 817-5700
==========
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Maxxam Job #: B8O6750
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR165				HUR167				
Sampling Date		2018/09/14 09:15				2018/09/14 13:55				
COC Number		na				na				
	UNITS	**2006FS-B1-0.5**	**DL**	**LOD**	**LOQ**	**2006FS-B2-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics										
Moisture	%	2.5	0.50	N/A	1.0	2.2	0.50	N/A	1.0	5746345
Miscellaneous Parameters										
6:2 Fluorotelomer sulfonate	ug/kg	0.70 U	0.23	0.70	0.88	0.62 U	0.20	0.62	0.78	5747190
8:2 Fluorotelomer sulfonate	ug/kg	0.70 U	0.29	0.70	0.88	0.62 U	0.26	0.62	0.78	5747190
EtFOSAA	ug/kg	0.44 U	0.13	0.44	0.88	0.39 U	0.12	0.39	0.78	5747190
MeFOSAA	ug/kg	0.70 U	0.23	0.70	0.88	0.62 U	0.20	0.62	0.78	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.79 J	0.15	0.44	0.88	0.47 J	0.13	0.39	0.78	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	0.70 U	0.25	0.70	0.88	0.62 U	0.22	0.62	0.78	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.77 U	0.27	0.77	0.96	0.66 U	0.23	0.66	0.83	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.44 U	0.17	0.44	0.88	0.39 U	0.15	0.39	0.78	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	25	0.21	0.44	0.88	6.4	0.19	0.39	0.78	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	0.46 J	0.12	0.44	0.88	0.33 J	0.11	0.39	0.78	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	0.49 J	0.22	0.70	0.88	0.46 J	0.20	0.62	0.78	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	0.44 U	0.19	0.44	0.88	0.39 U	0.17	0.39	0.78	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	78 (1)	2.3	7.0	8.8	26	0.20	0.62	0.78	5747190
Perfluorotetradecanoic Acid	ug/kg	0.70 U	0.27	0.70	0.88	0.62 U	0.24	0.62	0.78	5747190
Perfluorotridecanoic Acid	ug/kg	0.70 U	0.29	0.70	0.88	0.62 U	0.26	0.62	0.78	5747190
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.70 U	0.30	0.70	0.88	0.62 U	0.27	0.62	0.78	5747190
Surrogate Recovery (%)										
13C2-6:2 Fluorotelomer sulfonate	%	87				69				5747190
13C2-8:2 Fluorotelomer sulfonate	%	90				79				5747190
13C2-Perfluorodecanoic acid	%	76				71				5747190
13C2-Perfluorododecanoic acid	%	61				73				5765332
13C2-Perfluorohexanoic acid	%	78				73				5747190
13C2-perfluorotetradecanoic acid	%	66				63				5747190
13C2-Perfluoroundecanoic acid	%	74				63				5747190
13C4-Perfluoroheptanoic acid	%	80				71				5747190
13C4-Perfluorooctanesulfonate	%	82				72				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (10x).

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Maxxam Job #: B8O6750
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR165				HUR167				
Sampling Date		2018/09/14 09:15				2018/09/14 13:55				
COC Number		na				na				
	UNITS	**2006FS-B1-0.5**	**DL**	**LOD**	**LOQ**	**2006FS-B2-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanoic acid	%	78				73				5747190
13C5-Perfluorononanoic acid	%	74				71				5747190
18O2-Perfluorohexanesulfonate	%	82				73				5747190
D3-MeFOSAA	%	82				79				5747190
D5-EtFOSAA	%	85				80				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6750
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Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR169				HUR170				
Sampling Date		2018/09/14 14:30				2018/09/14 14:40				
COC Number		na				na				
	UNITS	**2006FS-SD1-0.5**	**DL**	**LOD**	**LOQ**	**2006FS-SD2-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics										
Moisture	%	21	0.50	N/A	1.0	N/A U	0.50	N/A	1.0	5746345
Miscellaneous Parameters										
6:2 Fluorotelomer sulfonate	ug/kg	0.88 U	0.29	0.88	1.1	0.70 U	0.23	0.70	0.87	5747190
8:2 Fluorotelomer sulfonate	ug/kg	0.88 U	0.36	0.88	1.1	0.70 U	0.29	0.70	0.87	5747190
EtFOSAA	ug/kg	0.55 U	0.17	0.55	1.1	0.44 U	0.13	0.44	0.87	5747190
MeFOSAA	ug/kg	0.88 U	0.29	0.88	1.1	0.70 U	0.23	0.70	0.87	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.47 J	0.19	0.55	1.1	0.32 J	0.15	0.44	0.87	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	0.88 U	0.31	0.88	1.1	0.70 U	0.24	0.70	0.87	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.80 U	0.28	0.80	1.0	0.67 U	0.24	0.67	0.84	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.55 U	0.21	0.55	1.1	0.44 U	0.17	0.44	0.87	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	5.1	0.26	0.55	1.1	3.1	0.21	0.44	0.87	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	0.69 J	0.15	0.55	1.1	0.44 J	0.12	0.44	0.87	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	0.59 J	0.28	0.88	1.1	0.70 U	0.22	0.70	0.87	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	0.55 U	0.24	0.55	1.1	0.44 U	0.19	0.44	0.87	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	64 (1)	2.9	8.8	11	37	0.23	0.70	0.87	5747190
Perfluorotetradecanoic Acid	ug/kg	0.88 U	0.34	0.88	1.1	0.70 U	0.27	0.70	0.87	5747190
Perfluorotridecanoic Acid	ug/kg	0.88 U	0.36	0.88	1.1	0.70 U	0.29	0.70	0.87	5747190
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.88 U	0.37	0.88	1.1	0.70 U	0.30	0.70	0.87	5747190
Surrogate Recovery (%)										
13C2-6:2 Fluorotelomer sulfonate	%	73				86				5747190
13C2-8:2 Fluorotelomer sulfonate	%	83				91				5747190
13C2-Perfluorodecanoic acid	%	73				73				5747190
13C2-Perfluorododecanoic acid	%	57				67				5765332
13C2-Perfluorohexanoic acid	%	73				77				5747190
13C2-perfluorotetradecanoic acid	%	59				63				5747190
13C2-Perfluoroundecanoic acid	%	69				70				5747190
13C4-Perfluoroheptanoic acid	%	74				78				5747190
13C4-Perfluorooctanesulfonate	%	78				78				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (10x).

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Maxxam Job #: B8O6750
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR169				HUR170				
Sampling Date		2018/09/14 14:30				2018/09/14 14:40				
COC Number		na				na				
	UNITS	**2006FS-SD1-0.5**	**DL**	**LOD**	**LOQ**	**2006FS-SD2-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanoic acid	%	72				75				5747190
13C5-Perfluorononanoic acid	%	69				74				5747190
18O2-Perfluorohexanesulfonate	%	75				79				5747190
D3-MeFOSAA	%	72				77				5747190
D5-EtFOSAA	%	76				79				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6750
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

TEST SUMMARY

Maxxam ID: HUR165
Sample ID: 2006FS-B1-0.5
Matrix: Soil

Collected: 2018/09/14
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR167
Sample ID: 2006FS-B2-0.5
Matrix: Soil

Collected: 2018/09/14
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR169
Sample ID: 2006FS-SD1-0.5
Matrix: Soil

Collected: 2018/09/14
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR170
Sample ID: 2006FS-SD2-0.5
Matrix: Soil

Collected: 2018/09/14
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

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Maxxam Job #: B8O6750
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.5°C

Samples 2006FS-B1-41 and 2006FS-B2-33 placed on HOLD as per client request.

Sample HUR165, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR167, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR169, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR170, PFOS and PFOA in soil by SPE/LCMS: Test repeated.

Results relate only to the items tested.

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Maxxam Job #: B8O6750
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Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5746345	NB3	RPD - Sample/Sample Dup	Moisture	2018/09/22	1.3		%	20
5747190	M_G	Matrix Spike	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		76	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		70	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		72	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		76	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		62	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		65	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		76	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		74	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		74	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		78	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		79	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		106	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		114	%	70 - 130
			D3-MeFOSAA	2018/09/30		66	%	50 - 150
			D5-EtFOSAA	2018/09/30		65	%	50 - 150
			EtFOSAA	2018/09/30		104	%	70 - 130
			MeFOSAA	2018/09/30		107	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		110	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		109	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		106	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		113	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		118	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		116	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		109	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		106	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		109	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		111	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		104	%	70 - 130
5747190	M_G	Matrix Spike DUP	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		68	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		65	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		67	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		74	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		59	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		65	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		73	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		67	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		72	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		70	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		76	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		111	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		115	%	70 - 130
			D3-MeFOSAA	2018/09/30		57	%	50 - 150
			D5-EtFOSAA	2018/09/30		57	%	50 - 150
			EtFOSAA	2018/09/30		111	%	70 - 130
			MeFOSAA	2018/09/30		114	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		114	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		120	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		118	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		114	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		119	%	70 - 130

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Maxxam Job #: B8O6750
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		120	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		115	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		110	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		112	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		115	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		117	%	70 - 130
5747190	M_G	MS/MSD RPD	6:2 Fluorotelomer sulfonate	2018/09/30	5.3		%	30
			8:2 Fluorotelomer sulfonate	2018/09/30	0.35		%	30
			EtFOSAA	2018/09/30	7.3		%	30
			MeFOSAA	2018/09/30	6.7		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/09/30	3.8		%	30
			Perfluorodecanoic Acid (PFDA)	2018/09/30	8.9		%	30
			Perfluorononanoic Acid (PFNA)	2018/09/30	10		%	30
			Perfluorotetradecanoic Acid	2018/09/30	0.70		%	30
			Perfluorotridecanoic Acid	2018/09/30	0.76		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30	3.3		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30	5.3		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30	4.2		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/09/30	2.3		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30	2.7		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/09/30	12		%	30
5747190	M_G	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		76	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		74	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		76	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		80	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		65	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		70	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		81	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		70	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		78	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		78	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		79	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		110	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		112	%	70 - 130
			D3-MeFOSAA	2018/09/30		67	%	50 - 150
			D5-EtFOSAA	2018/09/30		62	%	50 - 150
			EtFOSAA	2018/09/30		112	%	70 - 130
			MeFOSAA	2018/09/30		108	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		116	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		112	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		115	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		118	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		116	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		118	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		114	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		112	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		111	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		111	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		117	%	70 - 130
5747190	M_G	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		72	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		61	%	50 - 150

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Maxxam Job #: B8O6750
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C2-Perfluorodecanoic acid	2018/09/30		59	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		70	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		51	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		52	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		70	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		61	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		68	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		63	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		68	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			8:2 Fluorotelomer sulfonate	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			D3-MeFOSAA	2018/09/30		55	%	50 - 150
			D5-EtFOSAA	2018/09/30		53	%	50 - 150
			EtFOSAA	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			MeFOSAA	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorobutane Sulfonate (PFBS)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorodecanoic Acid (PFDA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorononanoic Acid (PFNA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorotetradecanoic Acid	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorotridecanoic Acid	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorohexanoic Acid (PFHxA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorooctane Sulfonate (PFOS)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
5765332	JDA	Matrix Spike	13C2-Perfluorododecanoic acid	2018/10/04		125	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		114	%	70 - 130
5765332	JDA	Matrix Spike DUP	13C2-Perfluorododecanoic acid	2018/10/04		108	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		133 (1)	%	70 - 130
5765332	JDA	MS/MSD RPD	Perfluorododecanoic Acid (PFDoA)	2018/10/04	15 (1)		%	30
5765332	JDA	Spiked Blank	13C2-Perfluorododecanoic acid	2018/10/04		77	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		118	%	70 - 130
5765332	JDA	Method Blank	13C2-Perfluorododecanoic acid	2018/10/04		84	%	50 - 150

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Maxxam Job #: B8O6750
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorododecanoic Acid (PFDoA)	2018/10/04	0.80 U, LOD=0.80		ug/kg	

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery of the matrix spike was above the upper control limit. Laboratory spiked soil resulted in satisfactory recovery of the compound of interest. When considered together, these QC data suggest that matrix interferences may be biasing the data high. For results that were not detected (ND), this potential bias has no impact.

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Maxxam Job #: B8O6750
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Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 2006 FUEL SPILL
Your P.O. #: 12198
Sampler Initials: MW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere, Scientific Service Specialist

Sin Chii Chia, Scientific Services

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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AIR OTIE
An Oneida Nation Company

Maxxam Analytics

CHAIN OF CUSTODY RECORD

DATE: 17 SEPT 2018
PAGE: 1 OF 1

(2006 FUEL SPILL)

LABORATORY/CLIENT	OTIE
ADDRESS	~~1777 N. California Blvd., Suite 310~~ 317 E Main St
CITY	~~Walnut Creek~~ VENTURA
STATE	CA
ZIP	~~94596~~ 93001
E-MAIL	Omartinez@otie.com
TEL	~~925-906-9698~~ 805 585 2110
FAX	~~925-906-9678~~ 805 585 2111
	EVasquez ~~MGuillin~~@otie.com
CLIENT PROJECT NAME / NUMBER	Vandenberg ~~Travis~~ AFB ~~2015341-10-1004~~ 2016186-07
PROJECT CONTACT	Oscar Martinez / Emmanuel Vasquez
LAB CONTACT / QUOTE NO.	Stephanie Pollen / ~~B64666~~
SAMPLER(S) (SIGNATURE)	
P.O. NO.	~~10995~~
SDG #	

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
-OTIE specific EDDs
-level IV data package ~~unless otherwise noted~~

REQUESTED ANALYSIS

Relinquished by commercial carrier: FEDEX

Preservation Codes:
H = HCl, NA = Not Applicable
N = HNO_3, T = Trizma
S = H_2SO_4, B = NaOH

Lab Use	SAMPLE ID	SAMPLING DATE	TIME	MATRIX	GRAB	COMP.	No. of containers	PFAS EPA 537 Modified	MS/MSD									NH (Preservative)	<-- Preservative / Remarks
	2006FS-B1-0.5	9.14.18	0915	SO			1	X										✓	
	2006FS-B1-41	9.14.18	1140	SO			3	X	X									✓	
	2006FS-B2-0.5	9.14.18	1355	SO			1	X										✓	
	2006FS-B2-33	9.14.18	1525	SO			1	X										✓	
	2006FS-SD1-0.5	9.14.18	1430	SO			1	X										✓	
	2006FS-SD2-0.5	9.14.18	1440	SO			1	X										✓	

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
		9.17.18	1530
Relinquished by: (Signature)	Received by: (Signature) FRANCINE CHONG	2018/09/20	14:06
Relinquished by: (Signature)	Received for (Signature)		

International Solid Sample
Heat Treat Required
High Risk material
Controlled Storage and Disposal

20-Sep-18 14:06
Stephanie Pollen
B8O6750

J_L ENV-994

5.0/3.9/4.5

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 12198
Your Project #: VANDENBURG AFB 2016186-07
Site Location: 2009 AFFF RELEASE
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/05
Report #: R5429569
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6761
Received: 2018/09/20, 14:06

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Moisture	5	N/A	2018/09/22	CAM SOP-00445	Carter 2nd ed 51.2 m
PFOS and PFOA in soil by SPE/LCMS (1)	5	2018/09/24	2018/09/30	CAM SOP-00894	EPA537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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Your P.O. #: 12198
Your Project #: VANDENBURG AFB 2016186-07
Site Location: 2009 AFFF RELEASE
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/05
Report #: R5429569
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6761
Received: 2018/09/20, 14:06

Encryption Key

Stephanie Pollen
Project Manager
05 Oct 2018 16:27:47

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Stephanie Pollen, Project Manager
Email: SPollen@maxxam.ca
Phone# (905) 817-5700
==========
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Maxxam Job #: B8O6761
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2016186-07
Site Location: 2009 AFFF RELEASE
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR265					HUR266				
Sampling Date		2018/09/12 13:10					2018/09/12 15:35				
COC Number		na					na				
	UNITS	**2009AFFF-B1-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**	**2009AFFF-B1-31.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics											
Moisture	%	30	0.50	N/A	1.0	5746599	26	0.50	N/A	1.0	5746599
Miscellaneous Parameters											
6:2 Fluorotelomer sulfonate	ug/kg	0.54 J	0.31	0.96	1.2	5747190	0.88 U	0.29	0.88	1.1	5747190
8:2 Fluorotelomer sulfonate	ug/kg	0.96 U	0.40	0.96	1.2	5747190	0.88 U	0.36	0.88	1.1	5747190
EtFOSAA	ug/kg	0.60 U	0.18	0.60	1.2	5747190	0.55 U	0.17	0.55	1.1	5747190
MeFOSAA	ug/kg	0.96 U	0.31	0.96	1.2	5747190	0.88 U	0.29	0.88	1.1	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.63 J	0.20	0.60	1.2	5747190	0.56 J	0.19	0.55	1.1	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	0.96 U	0.34	0.96	1.2	5747190	0.88 U	0.31	0.88	1.1	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	1.0 U	0.36	1.0	1.3	5765332	0.96 U	0.34	0.96	1.2	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.39 J	0.23	0.60	1.2	5747190	0.34 J	0.21	0.55	1.1	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	6.9	0.29	0.60	1.2	5747190	0.26 J	0.26	0.55	1.1	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	1.1 J	0.17	0.60	1.2	5747190	2.4	0.15	0.55	1.1	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	1.5	0.30	0.96	1.2	5747190	0.88 U	0.28	0.88	1.1	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	0.94 J	0.26	0.60	1.2	5747190	0.55 U	0.24	0.55	1.1	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	91 (1)	3.1	9.6	12	5747190	0.88 U	0.29	0.88	1.1	5747190
Perfluorotetradecanoic Acid	ug/kg	1.0 U	0.40	1.0	1.3	5765332	0.88 U	0.34	0.88	1.1	5747190
Perfluorotridecanoic Acid	ug/kg	1.0 U	0.43	1.0	1.3	5765332	0.88 U	0.36	0.88	1.1	5747190
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.96 U	0.41	0.96	1.2	5747190	0.88 U	0.37	0.88	1.1	5747190
Surrogate Recovery (%)											
13C2-6:2 Fluorotelomer sulfonate	%	64				5747190	76				5747190
13C2-8:2 Fluorotelomer sulfonate	%	60				5747190	69				5747190
13C2-Perfluorodecanoic acid	%	62				5747190	70				5747190
13C2-Perfluorododecanoic acid	%	62				5765332	95				5765332
13C2-Perfluorohexanoic acid	%	68				5747190	71				5747190
13C2-perfluorotetradecanoic acid	%	60				5765332	51				5747190
13C2-Perfluoroundecanoic acid	%	57				5747190	64				5747190
13C4-Perfluoroheptanoic acid	%	69				5747190	73				5747190
13C4-Perfluorooctanesulfonate	%	76				5747190	70				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (10x).

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Maxxam Job #: B8O6761
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2016186-07
Site Location: 2009 AFFF RELEASE
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR265					HUR266				
Sampling Date		2018/09/12 13:10					2018/09/12 15:35				
COC Number		na					na				
	UNITS	**2009AFFF-B1-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**	**2009AFFF-B1-31.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanoic acid	%	69				5747190	70				5747190
13C5-Perfluorononanoic acid	%	65				5747190	68				5747190
18O2-Perfluorohexanesulfonate	%	69				5747190	75				5747190
D3-MeFOSAA	%	56				5747190	59				5747190
D5-EtFOSAA	%	55				5747190	58				5747190

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR267				HUR268				
Sampling Date		2018/09/12 15:40				2018/09/12 09:45				
COC Number		na				na				
	UNITS	**DUP3-2009AFFF-31.5**	**DL**	**LOD**	**LOQ**	**2009AFFF-B2-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics										
Moisture	%	25	0.50	N/A	1.0	4.9	0.50	N/A	1.0	5746599
Miscellaneous Parameters										
6:2 Fluorotelomer sulfonate	ug/kg	0.96 U	0.31	0.96	1.2	0.83 J	0.25	0.78	0.97	5747190
8:2 Fluorotelomer sulfonate	ug/kg	0.96 U	0.40	0.96	1.2	0.78 U	0.32	0.78	0.97	5747190
EtFOSAA	ug/kg	0.60 U	0.18	0.60	1.2	0.49 U	0.15	0.49	0.97	5747190
MeFOSAA	ug/kg	0.96 U	0.31	0.96	1.2	0.78 U	0.25	0.78	0.97	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.50 J	0.20	0.60	1.2	1.4	0.16	0.49	0.97	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	0.96 U	0.34	0.96	1.2	0.78 U	0.27	0.78	0.97	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.88 U	0.31	0.88	1.1	0.71 U	0.25	0.71	0.89	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.36 J	0.23	0.60	1.2	0.58 J	0.18	0.49	0.97	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	0.30 J	0.29	0.60	1.2	15	0.23	0.49	0.97	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	2.0	0.17	0.60	1.2	1.4	0.14	0.49	0.97	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	0.96 U	0.30	0.96	1.2	1.4	0.24	0.78	0.97	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	0.60 U	0.26	0.60	1.2	1.2	0.21	0.49	0.97	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	0.96 U	0.31	0.96	1.2	180 (1)	2.5	7.8	9.7	5747190
Perfluorotetradecanoic Acid	ug/kg	0.96 U	0.37	0.96	1.2	0.78 U	0.30	0.78	0.97	5747190
Perfluorotridecanoic Acid	ug/kg	0.96 U	0.40	0.96	1.2	0.78 U	0.32	0.78	0.97	5747190
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.96 U	0.41	0.96	1.2	0.78 U	0.33	0.78	0.97	5747190
Surrogate Recovery (%)										
13C2-6:2 Fluorotelomer sulfonate	%	87				80				5747190
13C2-8:2 Fluorotelomer sulfonate	%	75				80				5747190
13C2-Perfluorodecanoic acid	%	76				78				5747190
13C2-Perfluorododecanoic acid	%	87				61				5765332
13C2-Perfluorohexanoic acid	%	79				86				5747190
13C2-perfluorotetradecanoic acid	%	53				70				5747190
13C2-Perfluoroundecanoic acid	%	68				77				5747190
13C4-Perfluoroheptanoic acid	%	79				88				5747190
13C4-Perfluorooctanesulfonate	%	75				84				5747190

DL = Detection Limit
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N/A = Not Applicable
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Maxxam Job #: B8O6761
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Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2016186-07
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Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR267				HUR268				
Sampling Date		2018/09/12 15:40				2018/09/12 09:45				
COC Number		na				na				
	UNITS	**DUP3-2009AFFF-31.5**	**DL**	**LOD**	**LOQ**	**2009AFFF-B2-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanoic acid	%	79				88				5747190
13C5-Perfluorononanoic acid	%	81				84				5747190
18O2-Perfluorohexanesulfonate	%	79				90				5747190
D3-MeFOSAA	%	67				76				5747190
D5-EtFOSAA	%	64				77				5747190

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QC Batch = Quality Control Batch
N/A = Not Applicable

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Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2016186-07
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Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR269				
Sampling Date		2018/09/12 12:00				
COC Number		na				
	UNITS	**2009AFFF-B2-33.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics						
Moisture	%	23	0.50	N/A	1.0	5746599
Miscellaneous Parameters						
6:2 Fluorotelomer sulfonate	ug/kg	0.80 U	0.26	0.80	1.0	5747190
8:2 Fluorotelomer sulfonate	ug/kg	0.80 U	0.33	0.80	1.0	5747190
EtFOSAA	ug/kg	0.50 U	0.15	0.50	1.0	5747190
MeFOSAA	ug/kg	0.80 U	0.26	0.80	1.0	5747190
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.50 U	0.17	0.50	1.0	5747190
Perfluorodecanoic Acid (PFDA)	ug/kg	0.80 U	0.28	0.80	1.0	5747190
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.96 U	0.34	0.96	1.2	5765332
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.50 U	0.19	0.50	1.0	5747190
Perfluorohexane Sulfonate (PFHxS)	ug/kg	0.50 U	0.24	0.50	1.0	5747190
Perfluorohexanoic Acid (PFHxA)	ug/kg	0.50 U	0.14	0.50	1.0	5747190
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	0.80 U	0.25	0.80	1.0	5747190
Perfluorononanoic Acid (PFNA)	ug/kg	0.50 U	0.22	0.50	1.0	5747190
Perfluorooctane Sulfonate (PFOS)	ug/kg	0.55 J	0.26	0.80	1.0	5747190
Perfluorotetradecanoic Acid	ug/kg	0.80 U	0.31	0.80	1.0	5747190
Perfluorotridecanoic Acid	ug/kg	0.80 U	0.33	0.80	1.0	5747190
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.80 U	0.34	0.80	1.0	5747190
Surrogate Recovery (%)						
13C2-6:2 Fluorotelomer sulfonate	%	74				5747190
13C2-8:2 Fluorotelomer sulfonate	%	69				5747190
13C2-Perfluorodecanoic acid	%	64				5747190
13C2-Perfluorododecanoic acid	%	85				5765332
13C2-Perfluorohexanoic acid	%	69				5747190
13C2-perfluorotetradecanoic acid	%	54				5747190
13C2-Perfluoroundecanoic acid	%	59				5747190
13C4-Perfluoroheptanoic acid	%	70				5747190
13C4-Perfluorooctanesulfonate	%	71				5747190
13C4-Perfluorooctanoic acid	%	69				5747190
13C5-Perfluorononanoic acid	%	69				5747190

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RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR269				
Sampling Date		2018/09/12 12:00				
COC Number		na				
	UNITS	**2009AFFF-B2-33.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
18O2-Perfluorohexanesulfonate	%	75				5747190
D3-MeFOSAA	%	54				5747190
D5-EtFOSAA	%	52				5747190

DL = Detection Limit
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QC Batch = Quality Control Batch
N/A = Not Applicable

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TEST SUMMARY

Maxxam ID: HUR265
Sample ID: 2009AFFF-B1-0.5
Matrix: Soil

Collected: 2018/09/12
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746599	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR266
Sample ID: 2009AFFF-B1-31.5
Matrix: Soil

Collected: 2018/09/12
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746599	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR267
Sample ID: DUP3-2009AFFF-31.5
Matrix: Soil

Collected: 2018/09/12
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746599	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR268
Sample ID: 2009AFFF-B2-0.5
Matrix: Soil

Collected: 2018/09/12
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746599	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

Maxxam ID: HUR269
Sample ID: 2009AFFF-B2-33.5
Matrix: Soil

Collected: 2018/09/12
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746599	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5747190	2018/09/24	2018/09/30	Marian Godax

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.5°C

Sample HUR265, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR266, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR267, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR268, PFOS and PFOA in soil by SPE/LCMS: Test repeated.
Sample HUR269, PFOS and PFOA in soil by SPE/LCMS: Test repeated.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5746599	GG2	RPD - Sample/Sample Dup	Moisture	2018/09/22	1.8		%	20
5747190	M_G	Matrix Spike	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		76	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		70	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		72	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		76	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		62	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		65	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		76	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		74	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		74	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		78	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		79	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		106	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		114	%	70 - 130
			D3-MeFOSAA	2018/09/30		66	%	50 - 150
			D5-EtFOSAA	2018/09/30		65	%	50 - 150
			EtFOSAA	2018/09/30		104	%	70 - 130
			MeFOSAA	2018/09/30		107	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		110	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		109	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		106	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		113	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		118	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		116	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		109	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		106	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		109	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		111	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		104	%	70 - 130
5747190	M_G	Matrix Spike DUP	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		68	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		65	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		67	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		74	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		59	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		65	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		73	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		67	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		72	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		70	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		76	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		111	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		115	%	70 - 130
			D3-MeFOSAA	2018/09/30		57	%	50 - 150
			D5-EtFOSAA	2018/09/30		57	%	50 - 150
			EtFOSAA	2018/09/30		111	%	70 - 130
			MeFOSAA	2018/09/30		114	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		114	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		120	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		118	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		114	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		119	%	70 - 130

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Oneida Total Integrated Enterprises
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		120	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		115	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		110	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		112	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		115	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		117	%	70 - 130
5747190	M_G	MS/MSD RPD	6:2 Fluorotelomer sulfonate	2018/09/30	5.3		%	30
			8:2 Fluorotelomer sulfonate	2018/09/30	0.35		%	30
			EtFOSAA	2018/09/30	7.3		%	30
			MeFOSAA	2018/09/30	6.7		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/09/30	3.8		%	30
			Perfluorodecanoic Acid (PFDA)	2018/09/30	8.9		%	30
			Perfluorononanoic Acid (PFNA)	2018/09/30	10		%	30
			Perfluorotetradecanoic Acid	2018/09/30	0.70		%	30
			Perfluorotridecanoic Acid	2018/09/30	0.76		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30	3.3		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30	5.3		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30	4.2		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/09/30	2.3		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30	2.7		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/09/30	12		%	30
5747190	M_G	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		76	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		74	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		76	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		80	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		65	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		70	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		81	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		70	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		78	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		78	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		79	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		110	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		112	%	70 - 130
			D3-MeFOSAA	2018/09/30		67	%	50 - 150
			D5-EtFOSAA	2018/09/30		62	%	50 - 150
			EtFOSAA	2018/09/30		112	%	70 - 130
			MeFOSAA	2018/09/30		108	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		116	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		112	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		115	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		118	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		116	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		118	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		114	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		112	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		111	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		111	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		117	%	70 - 130
5747190	M_G	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		72	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		61	%	50 - 150

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Maxxam Job #: B8O6761
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2016186-07
Site Location: 2009 AFFF RELEASE
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C2-Perfluorodecanoic acid	2018/09/30		59	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		70	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		51	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		52	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		70	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		61	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		68	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		63	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		68	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			8:2 Fluorotelomer sulfonate	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			D3-MeFOSAA	2018/09/30		55	%	50 - 150
			D5-EtFOSAA	2018/09/30		53	%	50 - 150
			EtFOSAA	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			MeFOSAA	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorobutane Sulfonate (PFBS)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorodecanoic Acid (PFDA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorononanoic Acid (PFNA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorotetradecanoic Acid	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorotridecanoic Acid	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluorohexanoic Acid (PFHxA)	2018/09/30	0.50 U, LOD=0.50		ug/kg	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
			Perfluorooctane Sulfonate (PFOS)	2018/09/30	0.80 U, LOD=0.80		ug/kg	
5765332	JDA	Matrix Spike	13C2-Perfluorododecanoic acid	2018/10/04		125	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		112	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		114	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		119	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/04		116	%	70 - 130
5765332	JDA	Matrix Spike DUP	13C2-Perfluorododecanoic acid	2018/10/04		108	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		112	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		133 (1)	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		127	%	70 - 130
5765332	JDA	MS/MSD RPD	Perfluorododecanoic Acid (PFDoA)	2018/10/04	15 (1)		%	30

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Maxxam Job #: B8O6761
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2016186-07
Site Location: 2009 AFFF RELEASE
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorotetradecanoic Acid	2018/10/04	6.5		%	30
5765332	JDA	Spiked Blank	13C2-Perfluorododecanoic acid	2018/10/04		77	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		82	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		118	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		118	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/04		111	%	70 - 130
5765332	JDA	Method Blank	13C2-Perfluorododecanoic acid	2018/10/04		84	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		82	%	50 - 150
			Perfluorododecanoic Acid (PFDoA)	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluorotetradecanoic Acid	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluorotridecanoic Acid	2018/10/04	0.80 U, LOD=0.80		ug/kg	

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery of the matrix spike was above the upper control limit. Laboratory spiked soil resulted in satisfactory recovery of the compound of interest. When considered together, these QC data suggest that matrix interferences may be biasing the data high. For results that were not detected (ND), this potential bias has no impact.

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Maxxam Job #: B8O6761
Report Date: 2018/10/05

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2016186-07
Site Location: 2009 AFFF RELEASE
Your P.O. #: 12198
Sampler Initials: MW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere, Scientific Service Specialist

Sin Chii Chia, Scientific Services

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AIR

OTIE
An Oneida Nation Company

Maxxam Analytics

2009 AFFF RELEASE

CHAIN OF CUSTODY RECORD

DATE: 17 SEPT 2018
PAGE: 1 OF 1

LABORATORY CLIENT: OTIE
ADDRESS: ~~1777 N. California Blvd., Suite 310~~ 317 E. MAIN ST
CITY: ~~Walnut Creek~~ VENTURA STATE: CA ZIP: ~~94596~~ 93001
TEL: ~~925-906-9698~~ (805) 585-2110 FAX: ~~925-906-9678~~ (805) 585-2111
E-MAIL: Omartinez@otie.com EVasquez MQuillin@otie.com
TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS
SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___
SPECIAL INSTRUCTIONS:
-OTIE specific EDDs
- level ~~III~~ data package ~~unless otherwise noted~~

CLIENT PROJECT NAME / NUMBER: ~~Travis AFB 2015341-10-1004~~ Vandenberg 2016186-07
P.O. NO: ~~10995~~
PROJECT CONTACT: Oscar Martinez / Emmanuel Vasquez
LAB CONTACT / QUOTE NO: Stephanie Pollen / ~~B64666~~
SAMPLER(S) (SIGNATURE):
SDG #:

REQUESTED ANALYSIS

Relinquished by commercial carrier: FEDEX

Preservation Codes:
H = HCl NA = Not Applicable
N = HNO_3 T = Trizma
S = H_2SO_4 B = NaOH

Lab Use	SAMPLE ID	SAMPLING DATE	TIME	MATRIX	GRAB	COMP.	No. of containers	PFAS EPA 537 Modified									WA (Preservative)	<-- Preservative / Remarks
	2009AFFF-B1-0.5	9/12/18	1310	SO			1	X									✓	
	2009AFFF-B1-31.5	9.12.18	1535	SO			1	X									✓	
	DUP3-2009AFFF-31.5	9.12.18	1540	SO			1	X									✓	
	2009AFFF-B2-0.5	9.12.18	0945	SO			1	X									✓	
	2009AFFF-B2-33.5	9.12.18	1200	SO			1	X									✓	

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
		9.17.18	1530
Relinquished by: (Signature)	Received by: (Signature) FRANCINE CHONG	2018/09/20	14:06
Relinquished by: (Signature)			

International Solid Sample
Heat Treat Required
High Risk material
Controlled Storage and Disposal

20-Sep-18 14:06
Stephanie Pollen
B8O6761
J_L ENV-994

5.0/3.9/4.5

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 12198
Your Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/12
Report #: R5437739
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6772
Received: 2018/09/20, 14:06

Sample Matrix: Soil
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Moisture	8	N/A	2018/09/22	CAM SOP-00445	Carter 2nd ed 51.2 m
PFOS and PFOA in soil by SPE/LCMS (1)	8	2018/09/28	2018/10/04	CAM SOP-00894	EPA537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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Your P.O. #: 12198
Your Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/12
Report #: R5437739
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6772
Received: 2018/09/20, 14:06

Encryption Key

Stephanie Pollen
Project Manager
12 Oct 2018 13:59:18

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Stephanie Pollen, Project Manager
Email: SPollen@maxxam.ca
Phone# (905) 817-5700
==========
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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR357				HUR358				HUR359				
Sampling Date		2018/09/11 13:05				2018/09/11 14:15				2018/09/13 08:45				
COC Number		na				na				na				
	UNITS	**STNA-SB1-0.5**	**DL**	**LOD**	**LOQ**	**STNA-SB1-20**	**DL**	**LOD**	**LOQ**	**STNA-SB2-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics														
Moisture	%	1.4	0.50	N/A	1.0	9.6	0.50	N/A	1.0	0.90 J	0.50	N/A	1.0	5746345
Miscellaneous Parameters														
6:2 Fluorotelomer sulfonate	ug/kg	2.7	0.24	0.73	0.91	0.80 U	0.26	0.80	1.0	10	0.24	0.73	0.91	5756803
8:2 Fluorotelomer sulfonate	ug/kg	6.2	0.30	0.73	0.91	0.80 U	0.33	0.80	1.0	23	0.30	0.73	0.91	5756803
EtFOSAA	ug/kg	0.77 J	0.14	0.46	0.91	0.50 U	0.15	0.50	1.0	0.46 U	0.14	0.46	0.91	5756803
MeFOSAA	ug/kg	0.71 J	0.24	0.73	0.91	0.80 U	0.26	0.80	1.0	0.73 U	0.24	0.73	0.91	5756803
Perfluorobutane Sulfonate (PFBS)	ug/kg	1.9	0.15	0.46	0.91	0.50 U	0.17	0.50	1.0	5.0	0.15	0.46	0.91	5756803
Perfluorodecanoic Acid (PFDA)	ug/kg	0.69 J	0.25	0.73	0.91	0.80 U	0.28	0.80	1.0	0.60 J	0.25	0.73	0.91	5756803
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.33 J	0.25	0.73	0.91	0.80 U	0.28	0.80	1.0	0.73 U	0.25	0.73	0.91	5756803
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.63 J	0.17	0.46	0.91	0.50 U	0.19	0.50	1.0	0.88 J	0.17	0.46	0.91	5756803
Perfluorohexane Sulfonate (PFHxS)	ug/kg	8.2	0.22	0.46	0.91	0.50 U	0.24	0.50	1.0	16	0.22	0.46	0.91	5756803
Perfluorohexanoic Acid (PFHxA)	ug/kg	7.5	0.13	0.46	0.91	0.50 U	0.14	0.50	1.0	11	0.13	0.46	0.91	5756803
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	2.1	0.23	0.73	0.91	0.80 U	0.25	0.80	1.0	2.9	0.23	0.73	0.91	5756803
Perfluorononanoic Acid (PFNA)	ug/kg	0.60 J	0.20	0.46	0.91	0.50 U	0.22	0.50	1.0	1.1	0.20	0.46	0.91	5756803
Perfluorooctane Sulfonate (PFOS)	ug/kg	150 (1)	2.4	7.3	9.1	0.80 U	0.26	0.80	1.0	1100 (2)	24	73	91	5756803
Perfluorotetradecanoic Acid	ug/kg	0.73 U	0.28	0.73	0.91	0.80 U	0.31	0.80	1.0	0.73 U	0.28	0.73	0.91	5756803
Perfluorotridecanoic Acid	ug/kg	0.73 U	0.30	0.73	0.91	0.80 U	0.33	0.80	1.0	0.73 U	0.30	0.73	0.91	5756803
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.36 J	0.31	0.73	0.91	0.80 U	0.34	0.80	1.0	0.73 U	0.31	0.73	0.91	5756803
Surrogate Recovery (%)														
13C2-6:2 Fluorotelomer sulfonate	%	119				123				117				5756803
13C2-8:2 Fluorotelomer sulfonate	%	106				112				105				5756803
13C2-Perfluorodecanoic acid	%	103				104				101				5756803
13C2-Perfluorododecanoic acid	%	97				104				97				5756803
13C2-Perfluorohexanoic acid	%	111				117				107				5756803
13C2-perfluorotetradecanoic acid	%	97				96				94				5756803
13C2-Perfluoroundecanoic acid	%	95				102				97				5756803
13C4-Perfluoroheptanoic acid	%	108				119				111				5756803
13C4-Perfluorooctanesulfonate	%	91				112				88				5756803

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (10x).
(2) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (100x).

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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR357				HUR358				HUR359				
Sampling Date		2018/09/11 13:05				2018/09/11 14:15				2018/09/13 08:45				
COC Number		na				na				na				
	UNITS	**STNA-SB1-0.5**	**DL**	**LOD**	**LOQ**	**STNA-SB1-20**	**DL**	**LOD**	**LOQ**	**STNA-SB2-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanoic acid	%	113				122				107				5756803
13C5-Perfluorononanoic acid	%	117				120				107				5756803
18O2-Perfluorohexanesulfonate	%	116				118				108				5756803
D3-MeFOSAA	%	108				117				104				5756803
D5-EtFOSAA	%	104				105				94				5756803

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR360				HUR361				HUR362				
Sampling Date		2018/09/13 10:00				2018/09/13 09:50				2018/09/13 09:55				
COC Number		na				na				na				
	UNITS	**STNA-SB2-19**	**DL**	**LOD**	**LOQ**	**STNA-SD1-0.5**	**DL**	**LOD**	**LOQ**	**DUP4-STNA-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics														
Moisture	%	14	0.50	N/A	1.0	1.1	0.50	N/A	1.0	1.0	0.50	N/A	1.0	5746345
Miscellaneous Parameters														
6:2 Fluorotelomer sulfonate	ug/kg	0.80 U	0.26	0.80	1.0	140 (1)	2.4	7.4	9.3	130 (1)	2.0	6.2	7.7	5756803
8:2 Fluorotelomer sulfonate	ug/kg	0.80 U	0.33	0.80	1.0	350 (1)	3.1	7.4	9.3	320 (1)	2.5	6.2	7.7	5756803
EtFOSAA	ug/kg	0.50 U	0.15	0.50	1.0	0.21 J	0.14	0.47	0.93	0.21 J	0.12	0.39	0.77	5756803
MeFOSAA	ug/kg	0.80 U	0.26	0.80	1.0	0.46 J	0.24	0.74	0.93	0.48 J	0.20	0.62	0.77	5756803
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.50 U	0.17	0.50	1.0	72 (1)	1.6	4.7	9.3	38	0.13	0.39	0.77	5756803
Perfluorodecanoic Acid (PFDA)	ug/kg	0.80 U	0.28	0.80	1.0	3.5	0.26	0.74	0.93	3.5	0.22	0.62	0.77	5756803
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.80 U	0.28	0.80	1.0	4.8	0.26	0.74	0.93	4.4	0.22	0.62	0.77	5756803
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.50 U	0.19	0.50	1.0	25	0.18	0.47	0.93	17	0.15	0.39	0.77	5756803
Perfluorohexane Sulfonate (PFHxS)	ug/kg	0.50 U	0.24	0.50	1.0	170 (1)	2.2	4.7	9.3	130 (1)	1.9	3.9	7.7	5756803
Perfluorohexanoic Acid (PFHxA)	ug/kg	0.50 U	0.14	0.50	1.0	290 (1)	1.3	4.7	9.3	200 (1)	1.1	3.9	7.7	5756803
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	0.80 U	0.25	0.80	1.0	68 (1)	2.3	7.4	9.3	57 (1)	1.9	6.2	7.7	5756803
Perfluorononanoic Acid (PFNA)	ug/kg	0.50 U	0.22	0.50	1.0	3.9	0.20	0.47	0.93	3.3	0.17	0.39	0.77	5756803
Perfluorooctane Sulfonate (PFOS)	ug/kg	0.80 U	0.26	0.80	1.0	930 (2)	24	74	93	840 (2)	20	62	77	5756803
Perfluorotetradecanoic Acid	ug/kg	0.80 U	0.31	0.80	1.0	1.2	0.29	0.74	0.93	1.1	0.24	0.62	0.77	5756803
Perfluorotridecanoic Acid	ug/kg	0.80 U	0.33	0.80	1.0	0.77 J	0.31	0.74	0.93	0.77	0.25	0.62	0.77	5756803
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.80 U	0.34	0.80	1.0	5.2	0.32	0.74	0.93	4.8	0.26	0.62	0.77	5756803
Surrogate Recovery (%)														
13C2-6:2 Fluorotelomer sulfonate	%	111				84				76				5756803
13C2-8:2 Fluorotelomer sulfonate	%	106				81				78				5756803
13C2-Perfluorodecanoic acid	%	100				101				98				5756803
13C2-Perfluorododecanoic acid	%	99				93				92				5756803
13C2-Perfluorohexanoic acid	%	110				61				57				5756803
13C2-perfluorotetradecanoic acid	%	90				99				90				5756803
13C2-Perfluoroundecanoic acid	%	97				95				97				5756803
13C4-Perfluoroheptanoic acid	%	110				120				117				5756803
13C4-Perfluorooctanesulfonate	%	110				61				74				5756803

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (10x).
(2) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (100x).

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR360				HUR361				HUR362				
Sampling Date		2018/09/13 10:00				2018/09/13 09:50				2018/09/13 09:55				
COC Number		na				na				na				
	UNITS	**STNA-SB2-19**	**DL**	**LOD**	**LOQ**	**STNA-SD1-0.5**	**DL**	**LOD**	**LOQ**	**DUP4-STNA-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanoic acid	%	110				87				82				5756803
13C5-Perfluorononanoic acid	%	106				126				122				5756803
18O2-Perfluorohexanesulfonate	%	108				68				60				5756803
D3-MeFOSAA	%	100				99				105				5756803
D5-EtFOSAA	%	102				104				106				5756803

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR363			HUR363				HUR364				
Sampling Date		2018/09/13 10:05			2018/09/13 10:05				2018/09/13 11:00				
COC Number		na			na				na				
	UNITS	**STNA-SD2-0.5**	**LOD**	**LOQ**	**STNA-SD2-0.5 Lab-Dup**	**DL**	**LOD**	**LOQ**	**STNA-SD3-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics													
Moisture	%	7.9	N/A	1.0	7.8	0.50	N/A	1.0	2.7	0.50	N/A	1.0	5746345
Miscellaneous Parameters													
6:2 Fluorotelomer sulfonate	ug/kg	83 (1)	8.8	11	N/A	2.9	8.8	11	29	0.23	0.72	0.90	5756803
8:2 Fluorotelomer sulfonate	ug/kg	4.2	0.88	1.1	N/A	0.36	0.88	1.1	1.9	0.30	0.72	0.90	5756803
EtFOSAA	ug/kg	0.55 U	0.55	1.1	N/A	0.17	0.55	1.1	0.45 U	0.14	0.45	0.90	5756803
MeFOSAA	ug/kg	0.88 U	0.88	1.1	N/A	0.29	0.88	1.1	0.72 U	0.23	0.72	0.90	5756803
Perfluorobutane Sulfonate (PFBS)	ug/kg	180 (1)	5.5	11	N/A	1.9	5.5	11	44	0.15	0.45	0.90	5756803
Perfluorodecanoic Acid (PFDA)	ug/kg	1.0 J	0.88	1.1	N/A	0.31	0.88	1.1	0.29 J	0.25	0.72	0.90	5756803
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.88 U	0.88	1.1	N/A	0.31	0.88	1.1	0.72 U	0.25	0.72	0.90	5756803
Perfluoroheptanoic Acid (PFHpA)	ug/kg	52 (1)	5.5	11	N/A	2.1	5.5	11	18	0.17	0.45	0.90	5756803
Perfluorohexane Sulfonate (PFHxS)	ug/kg	880 (2)	55	110	N/A	26	55	110	440 (1)	2.2	4.5	9.0	5756803
Perfluorohexanoic Acid (PFHxA)	ug/kg	400 (1)	5.5	11	N/A	1.5	5.5	11	130 (1)	1.3	4.5	9.0	5756803
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	250 (1)	8.8	11	N/A	2.8	8.8	11	100 (1)	2.3	7.2	9.0	5756803
Perfluorononanoic Acid (PFNA)	ug/kg	5.3	0.55	1.1	N/A	0.24	0.55	1.1	19	0.20	0.45	0.90	5756803
Perfluorooctane Sulfonate (PFOS)	ug/kg	1700 (2)	88	110	N/A	29	88	110	2200 (2)	23	72	90	5756803
Perfluorotetradecanoic Acid	ug/kg	0.88 U	0.88	1.1	N/A	0.34	0.88	1.1	0.72 U	0.28	0.72	0.90	5756803
Perfluorotridecanoic Acid	ug/kg	0.88 U	0.88	1.1	N/A	0.36	0.88	1.1	0.72 U	0.30	0.72	0.90	5756803
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.88 U	0.88	1.1	N/A	0.37	0.88	1.1	0.72 U	0.31	0.72	0.90	5756803
Surrogate Recovery (%)													
13C2-6:2 Fluorotelomer sulfonate	%	79			N/A	N/A	N/A		104				5756803
13C2-8:2 Fluorotelomer sulfonate	%	109			N/A	N/A	N/A		124				5756803
13C2-Perfluorodecanoic acid	%	95			N/A	N/A	N/A		112				5756803
13C2-Perfluorododecanoic acid	%	86			N/A	N/A	N/A		99				5756803
13C2-Perfluorohexanoic acid	%	60			N/A	N/A	N/A		58				5756803
13C2-perfluorotetradecanoic acid	%	80			N/A	N/A	N/A		96				5756803
13C2-Perfluoroundecanoic acid	%	88			N/A	N/A	N/A		103				5756803
13C4-Perfluoroheptanoic acid	%	80			N/A	N/A	N/A		110				5756803

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (10x).
(2) Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly (100x).

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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HUR363			HUR363				HUR364				
Sampling Date		2018/09/13 10:05			2018/09/13 10:05				2018/09/13 11:00				
COC Number		na			na				na				
	UNITS	**STNA-SD2-0.5**	**LOD**	**LOQ**	**STNA-SD2-0.5 Lab-Dup**	**DL**	**LOD**	**LOQ**	**STNA-SD3-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanesulfonate	%	74			N/A	N/A	N/A		81				5756803
13C4-Perfluorooctanoic acid	%	88			N/A	N/A	N/A		85				5756803
13C5-Perfluorononanoic acid	%	111			N/A	N/A	N/A		114				5756803
18O2-Perfluorohexanesulfonate	%	65			N/A	N/A	N/A		64				5756803
D3-MeFOSAA	%	87			N/A	N/A	N/A		115				5756803
D5-EtFOSAA	%	91			N/A	N/A	N/A		124				5756803

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LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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TEST SUMMARY

Maxxam ID: HUR357 **Collected:** 2018/09/11
Sample ID: STNA-SB1-0.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5756803	2018/09/28	2018/10/04	Anjan Desai

Maxxam ID: HUR358 **Collected:** 2018/09/11
Sample ID: STNA-SB1-20 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5756803	2018/09/28	2018/10/04	Anjan Desai

Maxxam ID: HUR359 **Collected:** 2018/09/13
Sample ID: STNA-SB2-0.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5756803	2018/09/28	2018/10/04	Anjan Desai

Maxxam ID: HUR360 **Collected:** 2018/09/13
Sample ID: STNA-SB2-19 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5756803	2018/09/28	2018/10/04	Anjan Desai

Maxxam ID: HUR361 **Collected:** 2018/09/13
Sample ID: STNA-SD1-0.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5756803	2018/09/28	2018/10/04	Anjan Desai

Maxxam ID: HUR362 **Collected:** 2018/09/13
Sample ID: DUP4-STNA-0.5 **Shipped:**
Matrix: Soil **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5756803	2018/09/28	2018/10/04	Anjan Desai

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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

TEST SUMMARY

Maxxam ID: HUR363
Sample ID: STNA-SD2-0.5
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5756803	2018/09/28	2018/10/04	Anjan Desai

Maxxam ID: HUR363 Dup
Sample ID: STNA-SD2-0.5
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal

Maxxam ID: HUR364
Sample ID: STNA-SD3-0.5
Matrix: Soil

Collected: 2018/09/13
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5746345	N/A	2018/09/22	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5756803	2018/09/28	2018/10/04	Anjan Desai

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Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.5°C

Results relate only to the items tested.

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Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5746345	NB3	RPD - Sample/Sample Dup	Moisture	2018/09/22	1.3		%	20
5756803	AD9	Matrix Spike(HUR363)	13C2-6:2 Fluorotelomer sulfonate	2018/10/04		90	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/04		122	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/04		98	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/04		91	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/04		106	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		90	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/04		96	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/04		99	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/04		80	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/04		99	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/04		122	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/04		102	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/04		NC	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/04		104	%	70 - 130
			D3-MeFOSAA	2018/10/04		98	%	50 - 150
			D5-EtFOSAA	2018/10/04		104	%	50 - 150
			EtFOSAA	2018/10/04		100	%	70 - 130
			MeFOSAA	2018/10/04		109	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/04		NC	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/04		105	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		109	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/04		107	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		104	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/04		107	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/04		103	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/04		NC	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/04		NC	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/04		NC	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/04		NC	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/04		NC	%	70 - 130
5756803	AD9	Matrix Spike DUP(HUR363)	13C2-6:2 Fluorotelomer sulfonate	2018/10/04		91	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/04		126	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/04		102	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/04		91	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/04		104	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		91	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/04		92	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/04		97	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/04		91	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/04		101	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/04		116	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/04		101	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/04		NC	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/04		95	%	70 - 130
			D3-MeFOSAA	2018/10/04		96	%	50 - 150
			D5-EtFOSAA	2018/10/04		102	%	50 - 150
			EtFOSAA	2018/10/04		100	%	70 - 130
			MeFOSAA	2018/10/04		109	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/04		NC	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/04		100	%	70 - 130

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Maxxam Job #: B8O6772
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Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		106	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/04		101	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		102	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/04		107	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/04		106	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/04		NC	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/04		NC	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/04		NC	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/04		NC	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/04		NC	%	70 - 130
5756803	AD9	MS/MSD RPD	6:2 Fluorotelomer sulfonate	2018/10/04	0		%	30
			8:2 Fluorotelomer sulfonate	2018/10/04	9.3		%	30
			EtFOSAA	2018/10/04	0.052		%	30
			MeFOSAA	2018/10/04	0.26		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/10/04	0		%	30
			Perfluorodecanoic Acid (PFDA)	2018/10/04	5.3		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/10/04	3.2		%	30
			Perfluorononanoic Acid (PFNA)	2018/10/04	5.6		%	30
			Perfluorotetradecanoic Acid	2018/10/04	2.0		%	30
			Perfluorotridecanoic Acid	2018/10/04	0.60		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/10/04	3.2		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/10/04	0		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/10/04	0		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/10/04	0		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/04	0		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/10/04	0		%	30
5756803	AD9	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/04		98	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/04		93	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/04		93	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/04		90	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/04		100	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		84	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/04		93	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/04		100	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/04		96	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/04		101	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/04		103	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/04		103	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/04		100	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/04		112	%	70 - 130
			D3-MeFOSAA	2018/10/04		101	%	50 - 150
			D5-EtFOSAA	2018/10/04		97	%	50 - 150
			EtFOSAA	2018/10/04		108	%	70 - 130
			MeFOSAA	2018/10/04		108	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/04		104	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/04		104	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/04		106	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/04		95	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/04		107	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/04		112	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/04		100	%	70 - 130

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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroheptanoic Acid (PFHpA)	2018/10/04		104	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/04		105	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/04		104	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/04		100	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/04		107	%	70 - 130
5756803	AD9	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/04		113	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/04		105	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/04		101	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/04		95	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/04		106	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/04		90	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/04		93	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/04		105	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/04		98	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/04		104	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/04		103	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/04		106	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			8:2 Fluorotelomer sulfonate	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			D3-MeFOSAA	2018/10/04		105	%	50 - 150
			D5-EtFOSAA	2018/10/04		107	%	50 - 150
			EtFOSAA	2018/10/04	0.50 U, LOD=0.50		ug/kg	
			MeFOSAA	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluorobutane Sulfonate (PFBS)	2018/10/04	0.50 U, LOD=0.50		ug/kg	
			Perfluorodecanoic Acid (PFDA)	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluorododecanoic Acid (PFDoA)	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluorononanoic Acid (PFNA)	2018/10/04	0.50 U, LOD=0.50		ug/kg	
			Perfluorotetradecanoic Acid	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluorotridecanoic Acid	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluoroundecanoic Acid (PFUnA)	2018/10/04	0.80 U, LOD=0.80		ug/kg	
			Perfluoroheptanoic Acid (PFHpA)	2018/10/04	0.50 U, LOD=0.50		ug/kg	
			Perfluorohexane Sulfonate (PFHxS)	2018/10/04	0.50 U, LOD=0.50		ug/kg	
			Perfluorohexanoic Acid (PFHxA)	2018/10/04	0.50 U, LOD=0.50		ug/kg	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/04	0.80 U, LOD=0.80		ug/kg	

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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorooctane Sulfonate (PFOS)	2018/10/04	0.80 U, LOD=0.80		ug/kg	

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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Maxxam Job #: B8O6772
Report Date: 2018/10/12

Oneida Total Integrated Enterprises
Client Project #: VANDENBURG AFB 2015341-10-1004
Site Location: SPRAY NOZZLE TEST AREA
Your P.O. #: 12198
Sampler Initials: MW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Colm McNamara, Senior Analyst, Liquid Chromatography

Cristina Carriere, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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AIR OTIE
An Oneida Nation Company

Maxxam Analytics

SPRAY NOZZLE TEST AREA

CHAIN OF CUSTODY RECORD

DATE: 17 Sept 2018
PAGE: 1 OF 1

LABORATORY NAME: OTIE
ADDRESS: ~~1777 N. California Blvd., Suite 340~~ 317 E MAIN ST
CITY: ~~Walnut Creek~~ VENTURA STATE: CA ZIP: ~~94596~~ 93001
TEL: ~~925-906-9698~~ 805 585 2110 FAX: ~~925-906-9678~~ 805 585 2111
E-MAIL: Omartinez@otie.com, Vasquez ~~MGuillin@otie.com~~

CLIENT PROJECT NAME / NUMBER: Travis AFB 2015341-10-1004
P.O. NO.: ~~10995~~
PROJECT CONTACT: Oscar Martinez / Emmanuel Vasquez
LAB CONTACT / QUOTE NO.: Stephanie Pollen / ~~B64666~~
SAMPLER(S) (SIGNATURE):
SDG #:

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
OTIE specific EDDs
level ~~II~~ data package ~~unless otherwise noted~~

REQUESTED ANALYSIS

Relinquished by commercial carrier: FEDEX

Preservation Codes: H = HCl, NA = Not Applicable, N = HNO_3, T = Trizma, S = H_2SO_4, B = NaOH

Lab Use	SAMPLE ID	SAMPLING DATE	TIME	MATRIX	GRAB	COMP	No. of containers	PFAS EPA 537 Modified	MS/MSD									NH (Preservative)	Remarks
	SNTA-SB1-0.5	9.11.18	1305	SO			1	X											
	SNTA-SB1-20	9.11.18	1415	SO			1	X											
	SNTA-SB2-0.5	9.13.18	0845	SO			1	X											
	SNTA-SB2-19	9.13.18	1000	SO			1	X											
	SNTA-SD1-0.5	9.13.18	0950	SO			1	X											
	DUP4-SNTA-0.5	9.13.18	0955	SO			1	X											
	SNTA-SD2-0.5	9.13.18	1005	SO			3	X	X										
	SNTA-SD3-0.5	9.13.18	1100	SO			1	X											

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
		17 Sept 2018	1530
Relinquished by: (Signature)	Received by: (Signature) FRANCINE CHONG	2018/09/20	14:06
Relinquished by: (Signature)	Received by: (Signature)		

International Solid Sample
Heat Treat Required
High Risk material
Controlled Storage and Disposal

20-Sep-18 14:06
Stephanie Pollen
B8O6772
J_L ENV-994

5.0/3.9/4.5

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/04
Report #: R5427298
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6809
Received: 2018/09/20, 14:06

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFOS and PFOA in water by SPE/LCMS (1)	2	2018/09/24	2018/09/28	CAM SOP-00894	EPA 537 m
PFOS and PFOA in water by SPE/LCMS (1)	1	2018/09/25	2018/09/28	CAM SOP-00894	EPA 537 m
PFOS and PFOA in water by SPE/LCMS (1)	3	2018/09/27	2018/10/01	CAM SOP-00894	EPA 537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/04
Report #: R5427298
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6809
Received: 2018/09/20, 14:06

Encryption Key

Stephanie Pollen
Project Manager
04 Oct 2018 17:02:36

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Stephanie Pollen, Project Manager
Email: SPollen@maxxam.ca
Phone# (905) 817-5700
==========
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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF WATER

Maxxam ID		HUR484		HUR485	HUR486				
Sampling Date		2018/09/13 08:30		2018/09/10 17:00	2018/09/11 14:45				
COC Number		na		na	na				
	UNITS	**FRB1-091318**	**QC Batch**	**EQB1-091018**	**EQB2-091118**	**DL**	**LOD**	**LOQ**	**QC Batch**
Miscellaneous Parameters									
6:2 Fluorotelomer sulfonate	ug/L	0.015 U	5754971	0.015 U	0.015 U	0.0066	0.015	0.020	5747222
8:2 Fluorotelomer sulfonate	ug/L	0.015 U	5754971	0.015 U	0.015 U	0.0066	0.015	0.020	5747222
EtFOSAA	ug/L	0.010 U	5754971	0.010 U	0.010 U	0.0033	0.010	0.020	5747222
MeFOSAA	ug/L	0.010 U	5754971	0.010 U	0.010 U	0.0029	0.010	0.020	5747222
Perfluorobutane Sulfonate (PFBS)	ug/L	0.015 U	5754971	0.015 U	0.015 U	0.0054	0.015	0.020	5747222
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.015 U	5754971	0.015 U	0.015 U	0.0074	0.015	0.020	5747222
Perfluorohexanoic Acid (PFHxA)	ug/L	0.010 U	5754971	0.010 U	0.010 U	0.0035	0.010	0.020	5747222
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.015 U	5754971	0.015 U	0.015 U	0.0056	0.015	0.020	5747222
Perfluorononanoic Acid (PFNA)	ug/L	0.018 U	5754971	0.018 U	0.018 U	0.0087	0.018	0.020	5747222
Perfluorotetradecanoic Acid	ug/L	0.010 U	5754971	0.010 U	0.010 U	0.0027	0.010	0.020	5747222
Perfluorotridecanoic Acid	ug/L	0.010 U	5754971	0.010 U	0.010 U	0.0038	0.010	0.020	5747222
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.010 U	5754971	0.010 U	0.010 U	0.0025	0.010	0.020	5747222
Perfluorodecanoic Acid (PFDA)	ug/L	0.015 U	5754971	0.015 U	0.015 U	0.0061	0.015	0.020	5747222
Perfluorododecanoic Acid (PFDoA)	ug/L	0.010 U	5754971	0.010 U	0.010 U	0.0050	0.010	0.020	5747222
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.010 U	5754971	0.010 U	0.010 U	0.0033	0.010	0.020	5747222
Perfluorooctane Sulfonate (PFOS)	ug/L	0.015 U	5754971	0.015 U	0.015 U	0.0060	0.015	0.020	5747222
Surrogate Recovery (%)									
13C2-6:2 Fluorotelomer sulfonate	%	104	5754971	90	99				5747222
13C2-8:2 Fluorotelomer sulfonate	%	90	5754971	89	99				5747222
13C2-Perfluorodecanoic acid	%	88	5754971	73	94				5747222
13C2-Perfluorododecanoic acid	%	83	5754971	63	86				5747222
13C2-Perfluorohexanoic acid	%	94	5754971	84	103				5747222
13C2-perfluorotetradecanoic acid	%	67	5754971	65	84				5747222
13C2-Perfluoroundecanoic acid	%	90	5754971	65	87				5747222
13C4-Perfluoroheptanoic acid	%	96	5754971	85	106				5747222
13C4-Perfluorooctanesulfonate	%	92	5754971	85	104				5747222
13C4-Perfluorooctanoic acid	%	94	5754971	86	106				5747222
13C5-Perfluorononanoic acid	%	96	5754971	80	103				5747222
18O2-Perfluorohexanesulfonate	%	87	5754971	83	104				5747222
D3-MeFOSAA	%	84	5754971	67	85				5747222

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF WATER

Maxxam ID		HUR484		HUR485	HUR486				
Sampling Date		2018/09/13 08:30		2018/09/10 17:00	2018/09/11 14:45				
COC Number		na		na	na				
	UNITS	**FRB1-091318**	**QC Batch**	**EQB1-091018**	**EQB2-091118**	**DL**	**LOD**	**LOQ**	**QC Batch**
D5-EtFOSAA	%	80	5754971	64	84				5747222

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF WATER

Maxxam ID		HUR487		HUR488	HUR489				
Sampling Date		2018/09/12 13:30		2018/09/13 15:00	2018/09/14 15:50				
COC Number		na		na	na				
	UNITS	**EQB3-091218**	**QC Batch**	**EQB4-091318**	**EQB5-091418**	**DL**	**LOD**	**LOQ**	**QC Batch**
Miscellaneous Parameters									
6:2 Fluorotelomer sulfonate	ug/L	0.015 U	5749155	0.011 J	0.015 U	0.0066	0.015	0.020	5754971
8:2 Fluorotelomer sulfonate	ug/L	0.015 U	5749155	0.013 J	0.015 U	0.0066	0.015	0.020	5754971
EtFOSAA	ug/L	0.010 U	5749155	0.010 U	0.010 U	0.0033	0.010	0.020	5754971
MeFOSAA	ug/L	0.010 U	5749155	0.010 U	0.010 U	0.0029	0.010	0.020	5754971
Perfluorobutane Sulfonate (PFBS)	ug/L	0.015 U	5749155	0.015 U	0.015 U	0.0054	0.015	0.020	5754971
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.015 U	5749155	0.015 U	0.015 U	0.0074	0.015	0.020	5754971
Perfluorohexanoic Acid (PFHxA)	ug/L	0.010 U	5749155	0.010 U	0.010 U	0.0035	0.010	0.020	5754971
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.015 U	5749155	0.015 U	0.015 U	0.0056	0.015	0.020	5754971
Perfluorononanoic Acid (PFNA)	ug/L	0.018 U	5749155	0.018 U	0.018 U	0.0087	0.018	0.020	5754971
Perfluorotetradecanoic Acid	ug/L	0.010 U	5749155	0.010 U	0.010 U	0.0027	0.010	0.020	5754971
Perfluorotridecanoic Acid	ug/L	0.010 U	5749155	0.010 U	0.010 U	0.0038	0.010	0.020	5754971
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.010 U	5749155	0.010 U	0.010 U	0.0025	0.010	0.020	5754971
Perfluorodecanoic Acid (PFDA)	ug/L	0.015 U	5749155	0.015 U	0.015 U	0.0061	0.015	0.020	5754971
Perfluorododecanoic Acid (PFDoA)	ug/L	0.010 U	5749155	0.010 U	0.010 U	0.0050	0.010	0.020	5754971
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.0069 J	5749155	0.0038 J	0.010 U	0.0033	0.010	0.020	5754971
Perfluorooctane Sulfonate (PFOS)	ug/L	0.015 U	5749155	0.020 J	0.015 U	0.0060	0.015	0.020	5754971
Surrogate Recovery (%)									
13C2-6:2 Fluorotelomer sulfonate	%	97	5749155	89	87				5754971
13C2-8:2 Fluorotelomer sulfonate	%	88	5749155	84	95				5754971
13C2-Perfluorodecanoic acid	%	93	5749155	86	90				5754971
13C2-Perfluorododecanoic acid	%	86	5749155	79	80				5754971
13C2-Perfluorohexanoic acid	%	100	5749155	93	93				5754971
13C2-perfluorotetradecanoic acid	%	82	5749155	71	74				5754971
13C2-Perfluoroundecanoic acid	%	90	5749155	83	90				5754971
13C4-Perfluoroheptanoic acid	%	97	5749155	91	91				5754971
13C4-Perfluorooctanesulfonate	%	105	5749155	89	96				5754971
13C4-Perfluorooctanoic acid	%	102	5749155	94	98				5754971
13C5-Perfluorononanoic acid	%	91	5749155	91	89				5754971
18O2-Perfluorohexanesulfonate	%	97	5749155	86	92				5754971
D3-MeFOSAA	%	87	5749155	78	83				5754971

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF WATER

Maxxam ID		HUR487		HUR488	HUR489				
Sampling Date		2018/09/12 13:30		2018/09/13 15:00	2018/09/14 15:50				
COC Number		na		na	na				
	UNITS	**EQB3-091218**	**QC Batch**	**EQB4-091318**	**EQB5-091418**	**DL**	**LOD**	**LOQ**	**QC Batch**
D5-EtFOSAA	%	80	5749155	78	81				5754971

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
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N/A = Not Applicable

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TEST SUMMARY

Maxxam ID: HUR484 **Collected:** 2018/09/13
Sample ID: FRB1-091318 **Shipped:**
Matrix: Water **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5754971	2018/09/27	2018/10/01	Adnan Khan

Maxxam ID: HUR485 **Collected:** 2018/09/10
Sample ID: EQB1-091018 **Shipped:**
Matrix: Water **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5747222	2018/09/24	2018/09/28	Adnan Khan

Maxxam ID: HUR486 **Collected:** 2018/09/11
Sample ID: EQB2-091118 **Shipped:**
Matrix: Water **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5747222	2018/09/24	2018/09/28	Adnan Khan

Maxxam ID: HUR487 **Collected:** 2018/09/12
Sample ID: EQB3-091218 **Shipped:**
Matrix: Water **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5749155	2018/09/25	2018/09/28	Adnan Khan

Maxxam ID: HUR488 **Collected:** 2018/09/13
Sample ID: EQB4-091318 **Shipped:**
Matrix: Water **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5754971	2018/09/27	2018/10/01	Adnan Khan

Maxxam ID: HUR489 **Collected:** 2018/09/14
Sample ID: EQB5-091418 **Shipped:**
Matrix: Water **Received:** 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5754971	2018/09/27	2018/10/01	Adnan Khan

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.5°C

Results relate only to the items tested.

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Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5747222	AKH	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/28		84	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/28		88	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/28		86	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/09/28		78	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/28		90	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/28		73	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/28		83	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/28		90	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/28		89	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/28		89	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/28		87	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/28		87	%	50 - 150
			D3-MeFOSAA	2018/09/28		76	%	50 - 150
			D5-EtFOSAA	2018/09/28		75	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/28		97	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/28		93	%	70 - 130
			EtFOSAA	2018/09/28		94	%	70 - 130
			MeFOSAA	2018/09/28		97	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/28		98	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/28		98	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/28		97	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/28		96	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/28		100	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/28		100	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/28		101	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/28		103	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/28		98	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/09/28		99	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/28		96	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/28		100	%	70 - 130
5747222	AKH	Spiked Blank DUP	13C2-6:2 Fluorotelomer sulfonate	2018/09/28		91	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/28		92	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/28		95	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/09/28		85	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/28		96	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/28		78	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/28		91	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/28		96	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/28		104	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/28		96	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/28		91	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/28		92	%	50 - 150
			D3-MeFOSAA	2018/09/28		82	%	50 - 150
			D5-EtFOSAA	2018/09/28		80	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/28		97	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/28		92	%	70 - 130
			EtFOSAA	2018/09/28		94	%	70 - 130
			MeFOSAA	2018/09/28		94	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/28		97	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/28		95	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/28		95	%	70 - 130

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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorohexane Sulfonate (PFHxS)	2018/09/28		97	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/28		100	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/28		98	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/28		100	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/28		100	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/28		98	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/09/28		96	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/28		95	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/28		84	%	70 - 130
5747222	AKH	RPD	6:2 Fluorotelomer sulfonate	2018/09/28	0.26		%	30
			8:2 Fluorotelomer sulfonate	2018/09/28	0.67		%	30
			EtFOSAA	2018/09/28	0.32		%	30
			MeFOSAA	2018/09/28	3.0		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/09/28	1.9		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/09/28	3.3		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/09/28	2.0		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/09/28	0.64		%	30
			Perfluorononanoic Acid (PFNA)	2018/09/28	0.58		%	30
			Perfluorotetradecanoic Acid	2018/09/28	2.7		%	30
			Perfluorotridecanoic Acid	2018/09/28	0.89		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/09/28	2.7		%	30
			Perfluorodecanoic Acid (PFDA)	2018/09/28	0.17		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/09/28	2.3		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/28	0.73		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/09/28	17		%	30
5747222	AKH	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/28		83	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/28		74	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/28		72	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/09/28		65	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/28		79	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/28		62	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/28		70	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/28		80	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/28		82	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/28		75	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/28		76	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/28		78	%	50 - 150
			D3-MeFOSAA	2018/09/28		65	%	50 - 150
			D5-EtFOSAA	2018/09/28		63	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/28	0.015 U, LOD=0.015		ug/L	
			8:2 Fluorotelomer sulfonate	2018/09/28	0.015 U, LOD=0.015		ug/L	
			EtFOSAA	2018/09/28	0.010 U, LOD=0.010		ug/L	
			MeFOSAA	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2018/09/28	0.015 U, LOD=0.015		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2018/09/28	0.015 U, LOD=0.015		ug/L	

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Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorohexanoic Acid (PFHxA)	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2018/09/28	0.015 U, LOD=0.015		ug/L	
			Perfluorononanoic Acid (PFNA)	2018/09/28	0.018 U, LOD=0.018		ug/L	
			Perfluorotetradecanoic Acid	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluorotridecanoic Acid	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluorodecanoic Acid (PFDA)	2018/09/28	0.015 U, LOD=0.015		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluorooctane Sulfonate (PFOS)	2018/09/28	0.015 U, LOD=0.015		ug/L	
5749155	AKH	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/28		94	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/28		101	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/28		93	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/09/28		95	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/28		98	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/28		86	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/28		99	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/28		99	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/28		107	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/28		94	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/28		100	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/28		97	%	50 - 150
			D3-MeFOSAA	2018/09/28		86	%	50 - 150
			D5-EtFOSAA	2018/09/28		81	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/28		95	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/28		89	%	70 - 130
			EtFOSAA	2018/09/28		89	%	70 - 130
			MeFOSAA	2018/09/28		93	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/28		97	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/28		94	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/28		94	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/28		93	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/28		90	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/28		92	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/28		93	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/28		90	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/28		102	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/09/28		88	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/28		96	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/28		84	%	70 - 130
5749155	AKH	Spiked Blank DUP	13C2-6:2 Fluorotelomer sulfonate	2018/09/28		90	%	50 - 150

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C2-8:2 Fluorotelomer sulfonate	2018/09/28		95	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/28		91	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/09/28		89	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/28		94	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/28		81	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/28		87	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/28		95	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/28		94	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/28		93	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/28		97	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/28		94	%	50 - 150
			D3-MeFOSAA	2018/09/28		84	%	50 - 150
			D5-EtFOSAA	2018/09/28		79	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/28		97	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/28		92	%	70 - 130
			EtFOSAA	2018/09/28		92	%	70 - 130
			MeFOSAA	2018/09/28		93	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/28		97	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/28		94	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/28		97	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/28		95	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/28		92	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/28		95	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/28		98	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/28		100	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/28		103	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/09/28		92	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/28		97	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/28		93	%	70 - 130
5749155	AKH	RPD	6:2 Fluorotelomer sulfonate	2018/09/28	2.3		%	30
			8:2 Fluorotelomer sulfonate	2018/09/28	2.7		%	30
			EtFOSAA	2018/09/28	3.1		%	30
			MeFOSAA	2018/09/28	0.66		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/09/28	0.36		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/09/28	0.23		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/09/28	3.0		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/09/28	2.5		%	30
			Perfluorononanoic Acid (PFNA)	2018/09/28	2.7		%	30
			Perfluorotetradecanoic Acid	2018/09/28	3.1		%	30
			Perfluorotridecanoic Acid	2018/09/28	4.6		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/09/28	10		%	30
			Perfluorodecanoic Acid (PFDA)	2018/09/28	0.94		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/09/28	3.6		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/28	0.90		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/09/28	10		%	30
5749155	AKH	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/28		100	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/28		93	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/28		88	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/09/28		81	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/28		97	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/28		75	%	50 - 150

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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C2-Perfluoroundecanoic acid	2018/09/28		86	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/28		95	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/28		92	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/28		99	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/28		100	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/28		95	%	50 - 150
			D3-MeFOSAA	2018/09/28		86	%	50 - 150
			D5-EtFOSAA	2018/09/28		79	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/28	0.015 U, LOD=0.015		ug/L	
			8:2 Fluorotelomer sulfonate	2018/09/28	0.015 U, LOD=0.015		ug/L	
			EtFOSAA	2018/09/28	0.010 U, LOD=0.010		ug/L	
			MeFOSAA	2018/09/28	0.0031 J, LOD=0.010		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2018/09/28	0.015 U, LOD=0.015		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2018/09/28	0.015 U, LOD=0.015		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2018/09/28	0.015 U, LOD=0.015		ug/L	
			Perfluorononanoic Acid (PFNA)	2018/09/28	0.018 U, LOD=0.018		ug/L	
			Perfluorotetradecanoic Acid	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluorotridecanoic Acid	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluorodecanoic Acid (PFDA)	2018/09/28	0.015 U, LOD=0.015		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2018/09/28	0.010 U, LOD=0.010		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/28	0.0048 J, LOD=0.010		ug/L	
			Perfluorooctane Sulfonate (PFOS)	2018/09/28	0.015 U, LOD=0.015		ug/L	
5754971	AKH	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/01		100	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/01		107	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/01		97	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/01		94	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/01		103	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/01		90	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/01		100	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/01		103	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/01		109	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/01		107	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/01		107	%	50 - 150

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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			18O2-Perfluorohexanesulfonate	2018/10/01		105	%	50 - 150
			D3-MeFOSAA	2018/10/01		85	%	50 - 150
			D5-EtFOSAA	2018/10/01		84	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/01		95	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/01		95	%	70 - 130
			EtFOSAA	2018/10/01		101	%	70 - 130
			MeFOSAA	2018/10/01		106	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/01		98	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/01		102	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/01		100	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/01		96	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/01		94	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/01		94	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/01		100	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/01		92	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/01		104	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/01		99	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/01		94	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/01		97	%	70 - 130
5754971	AKH	Spiked Blank DUP	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		85	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		84	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		87	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/09/30		78	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		93	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		76	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		88	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		86	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		92	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		90	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		90	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		90	%	50 - 150
			D3-MeFOSAA	2018/09/30		76	%	50 - 150
			D5-EtFOSAA	2018/09/30		75	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30		97	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/09/30		98	%	70 - 130
			EtFOSAA	2018/09/30		95	%	70 - 130
			MeFOSAA	2018/09/30		101	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/09/30		97	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30		105	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/09/30		97	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30		95	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/09/30		94	%	70 - 130
			Perfluorotetradecanoic Acid	2018/09/30		97	%	70 - 130
			Perfluorotridecanoic Acid	2018/09/30		103	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30		94	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/09/30		101	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/09/30		101	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30		95	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/09/30		97	%	70 - 130
5754971	AKH	RPD	6:2 Fluorotelomer sulfonate	2018/09/30	2.3		%	30
			8:2 Fluorotelomer sulfonate	2018/09/30	3.3		%	30

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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			EtFOSAA	2018/09/30	5.5		%	30
			MeFOSAA	2018/09/30	5.0		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/09/30	1.1		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30	2.8		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/09/30	3.0		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30	0.61		%	30
			Perfluorononanoic Acid (PFNA)	2018/09/30	0.053		%	30
			Perfluorotetradecanoic Acid	2018/09/30	3.4		%	30
			Perfluorotridecanoic Acid	2018/09/30	2.9		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30	1.6		%	30
			Perfluorodecanoic Acid (PFDA)	2018/09/30	2.4		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/09/30	1.9		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30	1.5		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/09/30	0.13		%	30
5754971	AKH	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/09/30		97	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/09/30		98	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/09/30		92	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/09/30		83	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/09/30		97	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/09/30		77	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/09/30		91	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/09/30		98	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/09/30		87	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/09/30		98	%	50 - 150
			13C5-Perfluorononanoic acid	2018/09/30		97	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/09/30		96	%	50 - 150
			D3-MeFOSAA	2018/09/30		78	%	50 - 150
			D5-EtFOSAA	2018/09/30		75	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/09/30	0.015 U, LOD=0.015		ug/L	
			8:2 Fluorotelomer sulfonate	2018/09/30	0.015 U, LOD=0.015		ug/L	
			EtFOSAA	2018/09/30	0.010 U, LOD=0.010		ug/L	
			MeFOSAA	2018/09/30	0.010 U, LOD=0.010		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2018/09/30	0.015 U, LOD=0.015		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2018/09/30	0.015 U, LOD=0.015		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2018/09/30	0.010 U, LOD=0.010		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2018/09/30	0.015 U, LOD=0.015		ug/L	
			Perfluorononanoic Acid (PFNA)	2018/09/30	0.018 U, LOD=0.018		ug/L	
			Perfluorotetradecanoic Acid	2018/09/30	0.010 U, LOD=0.010		ug/L	
			Perfluorotridecanoic Acid	2018/09/30	0.010 U, LOD=0.010		ug/L	

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Maxxam Job #: B8O6809
Report Date: 2018/10/04

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroundecanoic Acid (PFUnA)	2018/09/30	0.010 U, LOD=0.010		ug/L	
			Perfluorodecanoic Acid (PFDA)	2018/09/30	0.015 U, LOD=0.015		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2018/09/30	0.010 U, LOD=0.010		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/09/30	0.010 U, LOD=0.010		ug/L	
			Perfluorooctane Sulfonate (PFOS)	2018/09/30	0.015 U, LOD=0.015		ug/L	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B8O6809
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Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: QC SAMPLES
Your P.O. #: 12198
Sampler Initials: MW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Adam Robinson, Supervisor, LC/MS/MS

Sin Chii Chia, Scientific Services

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OTIE
An Oneida Nation Company

Maxxam Analytics

GC . SAMPLES

CHAIN OF CUSTODY RECORD

DATE: 17 SEPT 2018
PAGE: 1 OF 1

LABORATORY CLIENT: OTIE	CLIENT PROJECT NAME / NUMBER: VANDENBERG AFB ~~Travis AFB 2015341-10-1004~~ 2016186-07
P.O. NO.: ~~10995~~ ~	
ADDRESS: ~~1777 N. California Blvd., Suite 310~~ ~ 317 E MAIN ST	
CITY: ~~Walnut Creek~~ VENTURA	STATE: CA
ZIP: ~~94596~~ 93001	E-MAIL: Omartinez@otie.com
TEL: ~~925-906-9698~~ (805) 585-2110	FAX: ~~925-906-9678~~ 805/585-2111
E-MAIL: ~~MQuillin@otie.com~~	
PROJECT CONTACT: Oscar Martinez / EMMANUEL VASQUEZ	LAB CONTACT / QUOTE NO.: Stephanie Pollen / ~~B64666~~ ~
SAMPLER(S) (SIGNATURE): Mark W	SDG #

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____

SPECIAL INSTRUCTIONS
-OTIE specific EDDs
- level ~~III~~ IV data package ~~unless otherwise noted~~ ~

REQUESTED ANALYSIS

Relinquished by commercial carrier: FED EX

Preservation Codes:
H = HCl NA = Not Applicable
N = HNO_3 T = Trizma
S = H_2SO_4 B = NaOH

Lab Use	SAMPLE ID	SAMPLING DATE	TIME	MATRIX	GRAB	COMP	No. of containers	PFAS EPA 537 Modified										N/A (Preserved)	<-- Preservative / Remarks
	FRB1-091318	9/13/18	0830	WQ			2	X										✓	
	EQB1-091018	9/10/18	1700	WQ			2	X										✓	
	EQB2-091118	9/11/18	1445	WQ			2	X										✓	
	EQB3-091218	9/12/18	1330	WQ			2	X										✓	
	EQB4-091318	9/13/18	1500	WQ			2	X										✓	
	EQB5-091418	9/14/18	1550	WQ			2	X										✓	

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Mark Wood		17 SEPT 18	1530
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
	for FRANCINE CHONG	2018/09/20	14:06
Relinquished by: (Signature)	Received by: (Signature)	Date	Time

20-Sep-18 14:06
Stephanie Pollen
B8O6809

J_L ENV-658

5-0/39/4.5

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/10
Report #: R5434065
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8P4126
Received: 2018/09/27, 13:49

Sample Matrix: Ground Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFOS and PFOA in water by SPE/LCMS (1)	3	2018/10/01	2018/10/05	CAM SOP-00894	EPA 537 m

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFOS and PFOA in water by SPE/LCMS (1)	2	2018/10/01	2018/10/05	CAM SOP-00894	EPA 537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/10
Report #: R5434065
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8P4126
Received: 2018/09/27, 13:49

Encryption Key

Stephanie Pollen
Project Manager
10 Oct 2018 10:47:05

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Stephanie Pollen, Project Manager
Email: SPollen@maxxam.ca
Phone# (905) 817-5700
==========
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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF GROUND WATER

Maxxam ID		HWG899				HWG900				
Sampling Date		2018/09/21 14:15				2018/09/21 18:25				
COC Number		na				na				
	UNITS	**1992FS-MW1**	**DL**	**LOD**	**LOQ**	**1992FS-MW2**	**DL**	**LOD**	**LOQ**	**QC Batch**
Miscellaneous Parameters										
6:2 Fluorotelomer sulfonate	ug/L	0.013 J	0.0066	0.015	0.020	0.038	0.0066	0.015	0.020	5760448
8:2 Fluorotelomer sulfonate	ug/L	0.0080 J	0.0066	0.015	0.020	0.015 U	0.0066	0.015	0.020	5760448
EtFOSAA	ug/L	0.010 U	0.0033	0.010	0.020	0.010 U	0.0033	0.010	0.020	5760448
MeFOSAA	ug/L	0.010 U	0.0029	0.010	0.020	0.010 U	0.0029	0.010	0.020	5760448
Perfluorobutane Sulfonate (PFBS)	ug/L	0.048	0.0054	0.015	0.020	1.1 (1)	0.054	0.15	0.20	5760448
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.037	0.0074	0.015	0.020	0.21	0.0074	0.015	0.020	5760448
Perfluorohexanoic Acid (PFHxA)	ug/L	0.11	0.0035	0.010	0.020	0.93	0.0035	0.010	0.020	5760448
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.38	0.0056	0.015	0.020	2.1 (1)	0.056	0.15	0.20	5760448
Perfluorononanoic Acid (PFNA)	ug/L	0.018 U	0.0087	0.018	0.020	0.0095 J	0.0087	0.018	0.020	5760448
Perfluorotetradecanoic Acid	ug/L	0.010 U	0.0027	0.010	0.020	0.010 U	0.0027	0.010	0.020	5760448
Perfluorotridecanoic Acid	ug/L	0.010 U	0.0038	0.010	0.020	0.010 U	0.0038	0.010	0.020	5760448
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.010 U	0.0025	0.010	0.020	0.010 U	0.0025	0.010	0.020	5760448
Perfluorodecanoic Acid (PFDA)	ug/L	0.015 U	0.0061	0.015	0.020	0.015 U	0.0061	0.015	0.020	5760448
Perfluorododecanoic Acid (PFDoA)	ug/L	0.010 U	0.0050	0.010	0.020	0.010 U	0.0050	0.010	0.020	5760448
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.071	0.0033	0.010	0.020	0.063	0.0033	0.010	0.020	5760448
Perfluorooctane Sulfonate (PFOS)	ug/L	0.65	0.0060	0.015	0.020	0.35	0.0060	0.015	0.020	5760448
Surrogate Recovery (%)										
13C2-6:2 Fluorotelomer sulfonate	%	122				112				5760448
13C2-8:2 Fluorotelomer sulfonate	%	107				114				5760448
13C2-Perfluorodecanoic acid	%	115				114				5760448
13C2-Perfluorododecanoic acid	%	116				114				5760448
13C2-Perfluorohexanoic acid	%	119				117				5760448
13C2-perfluorotetradecanoic acid	%	98				89				5760448
13C2-Perfluoroundecanoic acid	%	112				115				5760448
13C4-Perfluoroheptanoic acid	%	120				116				5760448
13C4-Perfluorooctanesulfonate	%	123				119				5760448
13C4-Perfluorooctanoic acid	%	113				122				5760448
13C5-Perfluorononanoic acid	%	115				119				5760448

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, a reduced sample volume was extracted and analyzed. Detection limit was adjusted accordingly (10x).

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF GROUND WATER

Maxxam ID		HWG899				HWG900				
Sampling Date		2018/09/21 14:15				2018/09/21 18:25				
COC Number		na				na				
	UNITS	**1992FS-MW1**	**DL**	**LOD**	**LOQ**	**1992FS-MW2**	**DL**	**LOD**	**LOQ**	**QC Batch**
18O2-Perfluorohexanesulfonate	%	126				123				5760448
D3-MeFOSAA	%	113				110				5760448
D5-EtFOSAA	%	110				112				5760448

DL = Detection Limit
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QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF GROUND WATER

Maxxam ID		HWG902				
Sampling Date		2018/09/25 13:45				
COC Number		na				
	UNITS	**1992FS-MW3**	**DL**	**LOD**	**LOQ**	**QC Batch**
Miscellaneous Parameters						
6:2 Fluorotelomer sulfonate	ug/L	0.0074 J	0.0066	0.015	0.020	5760448
8:2 Fluorotelomer sulfonate	ug/L	0.015 U	0.0066	0.015	0.020	5760448
EtFOSAA	ug/L	0.010 U	0.0033	0.010	0.020	5760448
MeFOSAA	ug/L	0.010 U	0.0029	0.010	0.020	5760448
Perfluorobutane Sulfonate (PFBS)	ug/L	0.32	0.0054	0.015	0.020	5760448
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.070	0.0074	0.015	0.020	5760448
Perfluorohexanoic Acid (PFHxA)	ug/L	0.24	0.0035	0.010	0.020	5760448
Perfluorohexane Sulfonate (PFHxS)	ug/L	1.1 (1)	0.056	0.15	0.20	5760448
Perfluorononanoic Acid (PFNA)	ug/L	0.018 U	0.0087	0.018	0.020	5760448
Perfluorotetradecanoic Acid	ug/L	0.010 U	0.0027	0.010	0.020	5760448
Perfluorotridecanoic Acid	ug/L	0.010 U	0.0038	0.010	0.020	5760448
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.010 U	0.0025	0.010	0.020	5760448
Perfluorodecanoic Acid (PFDA)	ug/L	0.015 U	0.0061	0.015	0.020	5760448
Perfluorododecanoic Acid (PFDoA)	ug/L	0.010 U	0.0050	0.010	0.020	5760448
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.029	0.0033	0.010	0.020	5760448
Perfluorooctane Sulfonate (PFOS)	ug/L	0.044	0.0060	0.015	0.020	5760448
Surrogate Recovery (%)						
13C2-6:2 Fluorotelomer sulfonate	%	97				5760448
13C2-8:2 Fluorotelomer sulfonate	%	112				5760448
13C2-Perfluorodecanoic acid	%	104				5760448
13C2-Perfluorododecanoic acid	%	101				5760448
13C2-Perfluorohexanoic acid	%	108				5760448
13C2-perfluorotetradecanoic acid	%	96				5760448
13C2-Perfluoroundecanoic acid	%	107				5760448
13C4-Perfluoroheptanoic acid	%	103				5760448
13C4-Perfluorooctanesulfonate	%	121				5760448
13C4-Perfluorooctanoic acid	%	110				5760448
13C5-Perfluorononanoic acid	%	107				5760448

DL = Detection Limit
LOD = Limit of Detection
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QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Due to high concentration of the target analyte, a reduced sample volume was extracted and analyzed. Detection limit was adjusted accordingly (10x).

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Maxxam Job #: B8P4126
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Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF GROUND WATER

Maxxam ID		HWG902				
Sampling Date		2018/09/25 13:45				
COC Number		na				
	UNITS	**1992FS-MW3**	**DL**	**LOD**	**LOQ**	**QC Batch**
18O2-Perfluorohexanesulfonate	%	115				5760448
D3-MeFOSAA	%	103				5760448
D5-EtFOSAA	%	100				5760448

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N/A = Not Applicable

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF WATER

Maxxam ID		HWG901	HWG903				
Sampling Date		2018/09/21 18:30	2018/09/25 13:55				
COC Number		na	na				
	UNITS	**EQB8-092118**	**EQB10-092518**	**DL**	**LOD**	**LOQ**	**QC Batch**
Miscellaneous Parameters							
6:2 Fluorotelomer sulfonate	ug/L	0.015 U	0.015 U	0.0066	0.015	0.020	5760448
8:2 Fluorotelomer sulfonate	ug/L	0.015 U	0.015 U	0.0066	0.015	0.020	5760448
EtFOSAA	ug/L	0.010 U	0.010 U	0.0033	0.010	0.020	5760448
MeFOSAA	ug/L	0.010 U	0.010 U	0.0029	0.010	0.020	5760448
Perfluorobutane Sulfonate (PFBS)	ug/L	0.015 U	0.015 U	0.0054	0.015	0.020	5760448
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.015 U	0.015 U	0.0074	0.015	0.020	5760448
Perfluorohexanoic Acid (PFHxA)	ug/L	0.010 U	0.010 U	0.0035	0.010	0.020	5760448
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.015 U	0.015 U	0.0056	0.015	0.020	5760448
Perfluorononanoic Acid (PFNA)	ug/L	0.018 U	0.018 U	0.0087	0.018	0.020	5760448
Perfluorotetradecanoic Acid	ug/L	0.010 U	0.010 U	0.0027	0.010	0.020	5760448
Perfluorotridecanoic Acid	ug/L	0.010 U	0.010 U	0.0038	0.010	0.020	5760448
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.010 U	0.010 U	0.0025	0.010	0.020	5760448
Perfluorodecanoic Acid (PFDA)	ug/L	0.015 U	0.015 U	0.0061	0.015	0.020	5760448
Perfluorododecanoic Acid (PFDoA)	ug/L	0.010 U	0.010 U	0.0050	0.010	0.020	5760448
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.010 U	0.010 U	0.0033	0.010	0.020	5760448
Perfluorooctane Sulfonate (PFOS)	ug/L	0.015 U	0.015 U	0.0060	0.015	0.020	5760448
Surrogate Recovery (%)							
13C2-6:2 Fluorotelomer sulfonate	%	118	123				5760448
13C2-8:2 Fluorotelomer sulfonate	%	121	129				5760448
13C2-Perfluorodecanoic acid	%	122	115				5760448
13C2-Perfluorododecanoic acid	%	112	115				5760448
13C2-Perfluorohexanoic acid	%	122	116				5760448
13C2-perfluorotetradecanoic acid	%	112	103				5760448
13C2-Perfluoroundecanoic acid	%	122	117				5760448
13C4-Perfluoroheptanoic acid	%	124	123				5760448
13C4-Perfluorooctanesulfonate	%	124	129				5760448
13C4-Perfluorooctanoic acid	%	124	122				5760448
13C5-Perfluorononanoic acid	%	118	123				5760448
18O2-Perfluorohexanesulfonate	%	125	127				5760448
D3-MeFOSAA	%	108	111				5760448

DL = Detection Limit
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LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF WATER

Maxxam ID		HWG901	HWG903				
Sampling Date		2018/09/21 18:30	2018/09/25 13:55				
COC Number		na	na				
	UNITS	**EQB8-092118**	**EQB10-092518**	**DL**	**LOD**	**LOQ**	**QC Batch**
D5-EtFOSAA	%	112	108				5760448

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LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

TEST SUMMARY

Maxxam ID: HWG899 **Collected:** 2018/09/21
Sample ID: 1992FS-MW1 **Shipped:**
Matrix: Ground Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5760448	2018/10/01	2018/10/05	Anjan Desai

Maxxam ID: HWG900 **Collected:** 2018/09/21
Sample ID: 1992FS-MW2 **Shipped:**
Matrix: Ground Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5760448	2018/10/01	2018/10/05	Anjan Desai

Maxxam ID: HWG901 **Collected:** 2018/09/21
Sample ID: EQB8-092118 **Shipped:**
Matrix: Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5760448	2018/10/01	2018/10/05	Anjan Desai

Maxxam ID: HWG902 **Collected:** 2018/09/25
Sample ID: 1992FS-MW3 **Shipped:**
Matrix: Ground Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5760448	2018/10/01	2018/10/05	Anjan Desai

Maxxam ID: HWG903 **Collected:** 2018/09/25
Sample ID: EQB10-092518 **Shipped:**
Matrix: Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5760448	2018/10/01	2018/10/05	Anjan Desai

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Results relate only to the items tested.

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5760448	AD9	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		130	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		120	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		114	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		114	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		119	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		111	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		113	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		116	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/05		109	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		110	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		104	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		115	%	50 - 150
			D3-MeFOSAA	2018/10/05		106	%	50 - 150
			D5-EtFOSAA	2018/10/05		107	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05		89	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/05		98	%	70 - 130
			EtFOSAA	2018/10/05		91	%	70 - 130
			MeFOSAA	2018/10/05		94	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/05		104	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05		99	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/05		96	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05		100	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/05		91	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/05		90	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/05		96	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05		93	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/05		96	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/05		97	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05		93	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/05		101	%	70 - 130
5760448	AD9	Spiked Blank DUP	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		115	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		124	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		115	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		115	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		125	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		104	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		120	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		123	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/05		123	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		125	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		122	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		122	%	50 - 150
			D3-MeFOSAA	2018/10/05		107	%	50 - 150
			D5-EtFOSAA	2018/10/05		107	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05		94	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/05		93	%	70 - 130
			EtFOSAA	2018/10/05		91	%	70 - 130
			MeFOSAA	2018/10/05		94	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/05		103	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05		96	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/05		96	%	70 - 130

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05		101	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/05		92	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/05		95	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/05		100	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05		91	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/05		101	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/05		92	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05		91	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/05		99	%	70 - 130
5760448	AD9	RPD	6:2 Fluorotelomer sulfonate	2018/10/05	5.5		%	30
			8:2 Fluorotelomer sulfonate	2018/10/05	6.0		%	30
			EtFOSAA	2018/10/05	0.021		%	30
			MeFOSAA	2018/10/05	0.18		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/10/05	1.3		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05	2.9		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/10/05	0.36		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05	0.87		%	30
			Perfluorononanoic Acid (PFNA)	2018/10/05	1.4		%	30
			Perfluorotetradecanoic Acid	2018/10/05	4.8		%	30
			Perfluorotridecanoic Acid	2018/10/05	3.1		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05	2.2		%	30
			Perfluorodecanoic Acid (PFDA)	2018/10/05	5.1		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/10/05	5.7		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05	2.0		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/10/05	2.4		%	30
5760448	AD9	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		110	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		93	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		90	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		89	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		98	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		79	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		91	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		97	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/05		95	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		101	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		96	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		99	%	50 - 150
			D3-MeFOSAA	2018/10/05		80	%	50 - 150
			D5-EtFOSAA	2018/10/05		80	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05	0.015 U, LOD=0.015		ug/L	
			8:2 Fluorotelomer sulfonate	2018/10/05	0.015 U, LOD=0.015		ug/L	
			EtFOSAA	2018/10/05	0.010 U, LOD=0.010		ug/L	
			MeFOSAA	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05	0.015 U, LOD=0.015		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorohexanoic Acid (PFHxA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluorononanoic Acid (PFNA)	2018/10/05	0.018 U, LOD=0.018		ug/L	
			Perfluorotetradecanoic Acid	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorotridecanoic Acid	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorodecanoic Acid (PFDA)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorooctane Sulfonate (PFOS)	2018/10/05	0.015 U, LOD=0.015		ug/L	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B8P4126
Report Date: 2018/10/10

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (WATER)
Your P.O. #: 12198
Sampler Initials: MW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Colm McNamara, Senior Analyst, Liquid Chromatography

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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AIR OTIE
An Oneida Nation Company

Maxxam Analytics

1992 Fuel Spill
(water)

CHAIN OF CUSTODY RECORD

DATE: 25 Sept 2018
PAGE: 1 OF 1

LABORATORY CLIENT	OTIE
ADDRESS	317 E. Main Street
CITY	Ventura
STATE	CA
ZIP	93001
TEL	805-585-4314
FAX	805-585-2111
E-MAIL	evasquez@otie.com SGilbert@otie.com jharting@otie.com
CLIENT PROJECT NAME / NUMBER	Vandenberg AFB 2016186-07
PO NO	12198
PROJECT CONTACT	Emmanuel Vasquez
LAB CONTACT / QUOTE NO	Stephanie Pollen / B64666
SAMPLER(S) (SIGNATURE)	[signature]
SOG #	

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS
-OTIE specific EDDs
- level ~~III~~ IV data package ~~unless otherwise noted.~~

Carrier:
☑ FedEx ☐ UPS ☑ Other

Tracking Number:

REQUESTED ANALYSIS

Preservation Codes:
NA = Not Applicable
T = Trizma
H = HCl
N = HNO_3
S = H_2SO_4
B = NaOH

Lab Use	SAMPLE ID	SAMPLING DATE	TIME	MATRIX	GRAB	COMP.	Start Depth	End Depth	No. of containers ↓	PFAS ASTM D7968-14 (NA)	PFAS EPA 537 Modified (NA)	PFAS EPA 537 Modified (T)					<-- Preservative / Remarks
	1992FS-MW1	09/21/18	1415	WG			—	—	2		X						
	1992FS-MW2	09/21/18	1825	WG			—	—	2		X						
	EQB8-092118	09/21/18	1830	WQ			—	—	2		X						
	1992FS-MW3	09/25/18	1345	WG			—	—	2		X						
	EQB10-092518	09/25/18	1355	WQ			—	—	2		X						

Relinquished by: (Signature) [signature]	Received by: (Signature) for FRANCINE CHONG	Date 9/25/18	Time 1510
Relinquished by: (Signature)	Received by: (Signature)	Date 2018/09/27	Time 13:49
Relinquished by: (Signature)	Received by: (Signature)	Date	Time

27-Sep-18 13:49
Stephanie Pollen
B8P4126
J_L ENV-1314

3.2/1.5/1.4
#26600

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/11
Report #: R5436202
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8P4134
Received: 2018/09/27, 13:49

Sample Matrix: Ground Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFOS and PFOA in water by SPE/LCMS (1)	2	2018/10/01	2018/10/05	CAM SOP-00894	EPA 537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/11
Report #: R5436202
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8P4134
Received: 2018/09/27, 13:49

Encryption Key

Stephanie Pollen
Project Manager
11 Oct 2018 14:00:34

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Stephanie Pollen, Project Manager
Email: SPollen@maxxam.ca
Phone# (905) 817-5700
==========
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Maxxam Job #: B8P4134
Report Date: 2018/10/11

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF GROUND WATER

Maxxam ID		HWG919			HWG919			HWG920				
Sampling Date		2018/09/21 17:10			2018/09/21 17:10			2018/09/21 17:15				
COC Number		na			na			na				
	UNITS	**21-MW-1**	**LOD**	**LOQ**	**21-MW-1 Lab-Dup**	**LOD**	**LOQ**	**DUP-FT021-1**	**DL**	**LOD**	**LOQ**	**QC Batch**
Miscellaneous Parameters												
6:2 Fluorotelomer sulfonate	ug/L	5.8 (1)	1.5	2.0	N/A	1.5	2.0	5.6 (1)	0.66	1.5	2.0	5760448
8:2 Fluorotelomer sulfonate	ug/L	11 (1)	1.5	2.0	N/A	1.5	2.0	11 (1)	0.66	1.5	2.0	5760448
EtFOSAA	ug/L	1.0 U (1)	1.0	2.0	N/A	1.0	2.0	1.0 U (1)	0.33	1.0	2.0	5760448
MeFOSAA	ug/L	1.0 U (1)	1.0	2.0	N/A	1.0	2.0	1.0 U (1)	0.29	1.0	2.0	5760448
Perfluorobutane Sulfonate (PFBS)	ug/L	1.1 J (1)	1.5	2.0	N/A	1.5	2.0	1.1 J (1)	0.54	1.5	2.0	5760448
Perfluoroheptanoic Acid (PFHpA)	ug/L	2.2 (1)	1.5	2.0	N/A	1.5	2.0	2.3 (1)	0.74	1.5	2.0	5760448
Perfluorohexanoic Acid (PFHxA)	ug/L	7.9 (1)	1.0	2.0	N/A	1.0	2.0	8.0 (1)	0.35	1.0	2.0	5760448
Perfluorohexane Sulfonate (PFHxS)	ug/L	21 (1)	1.5	2.0	N/A	1.5	2.0	22 (1)	0.56	1.5	2.0	5760448
Perfluorononanoic Acid (PFNA)	ug/L	1.7 J (1)	1.8	2.0	N/A	1.8	2.0	1.8 J (1)	0.87	1.8	2.0	5760448
Perfluorotetradecanoic Acid	ug/L	1.0 U (1)	1.0	2.0	N/A	1.0	2.0	1.0 U (1)	0.27	1.0	2.0	5760448
Perfluorotridecanoic Acid	ug/L	1.0 U (1)	1.0	2.0	N/A	1.0	2.0	1.0 U (1)	0.38	1.0	2.0	5760448
Perfluoroundecanoic Acid (PFUnA)	ug/L	1.0 U (1)	1.0	2.0	N/A	1.0	2.0	1.0 U (1)	0.25	1.0	2.0	5760448
Perfluorodecanoic Acid (PFDA)	ug/L	1.5 U (1)	1.5	2.0	N/A	1.5	2.0	1.5 U (1)	0.61	1.5	2.0	5760448
Perfluorododecanoic Acid (PFDoA)	ug/L	1.0 U (1)	1.0	2.0	N/A	1.0	2.0	1.0 U (1)	0.50	1.0	2.0	5760448
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	7.8 (1)	1.0	2.0	N/A	1.0	2.0	8.2 (1)	0.33	1.0	2.0	5760448
Perfluorooctane Sulfonate (PFOS)	ug/L	150 (2)	7.0	8.0	160 (2)	7.0	8.0	150 (2)	3.3	7.0	8.0	5762864
Surrogate Recovery (%)												
13C2-6:2 Fluorotelomer sulfonate	%	135			N/A	N/A	N/A	128				5760448
13C2-8:2 Fluorotelomer sulfonate	%	127			N/A	N/A	N/A	125				5760448
13C2-Perfluorodecanoic acid	%	117			N/A	N/A	N/A	109				5760448
13C2-Perfluorododecanoic acid	%	117			N/A	N/A	N/A	103				5760448
13C2-Perfluorohexanoic acid	%	124			N/A	N/A	N/A	115				5760448
13C2-perfluorotetradecanoic acid	%	108			N/A	N/A	N/A	101				5760448
13C2-Perfluoroundecanoic acid	%	114			N/A	N/A	N/A	110				5760448
13C4-Perfluoroheptanoic acid	%	127			N/A	N/A	N/A	115				5760448

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limit was adjusted accordingly (100x).
(2) Due to high concentration of the target analyte, sample required high level analysis with additional serial dilutions. Detection limit was adjusted accordingly (10x). Post spike sample recovery is not applicable due to native concentration.

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Maxxam Job #: B8P4134
Report Date: 2018/10/11

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF GROUND WATER

Maxxam ID		HWG919			HWG919			HWG920				
Sampling Date		2018/09/21 17:10			2018/09/21 17:10			2018/09/21 17:15				
COC Number		na			na			na				
	UNITS	**21-MW-1**	**LOD**	**LOQ**	**21-MW-1 Lab-Dup**	**LOD**	**LOQ**	**DUP-FT021-1**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluorooctanesulfonate	%	102			98			92				5762864
13C4-Perfluorooctanoic acid	%	124			N/A	N/A	N/A	115				5760448
13C5-Perfluorononanoic acid	%	127			N/A	N/A	N/A	116				5760448
18O2-Perfluorohexanesulfonate	%	137			N/A	N/A	N/A	127				5760448
D3-MeFOSAA	%	110			N/A	N/A	N/A	102				5760448
D5-EtFOSAA	%	110			N/A	N/A	N/A	102				5760448

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam ID		HWG920				
Sampling Date		2018/09/21 17:15				
COC Number		na				
	UNITS	**DUP-FT021-1 Lab-Dup**	**DL**	**LOD**	**LOQ**	**QC Batch**
Miscellaneous Parameters						
Perfluorooctane Sulfonate (PFOS)	ug/L	130 (1)	3.3	7.0	8.0	5762864
Surrogate Recovery (%)						
13C4-Perfluorooctanesulfonate	%	111				5762864

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Due to high concentration of the target analyte, sample required high level analysis with additional serial dilutions. Detection limit was adjusted accordingly (10x). Post spike sample recovery is not applicable due to native concentration.

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Maxxam Job #: B8P4134
Report Date: 2018/10/11

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your P.O. #: 12198
Sampler Initials: MW

TEST SUMMARY

Maxxam ID: HWG919 **Collected:** 2018/09/21
Sample ID: 21-MW-1 **Shipped:**
Matrix: Ground Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5760448	2018/10/01	2018/10/05	Anjan Desai

Maxxam ID: HWG919 Dup **Collected:** 2018/09/21
Sample ID: 21-MW-1 **Shipped:**
Matrix: Ground Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5762864	2018/10/02	2018/10/06	Janet Dalisay

Maxxam ID: HWG920 **Collected:** 2018/09/21
Sample ID: DUP-FT021-1 **Shipped:**
Matrix: Ground Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5760448	2018/10/01	2018/10/05	Anjan Desai

Maxxam ID: HWG920 Dup **Collected:** 2018/09/21
Sample ID: DUP-FT021-1 **Shipped:**
Matrix: Ground Water **Received:** 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5762864	2018/10/02	2018/10/06	Janet Dalisay

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Maxxam Job #: B8P4134
Report Date: 2018/10/11

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your P.O. #: 12198
Sampler Initials: MW

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Sample HWG919, PFOS and PFOA in water by SPE/LCMS: Test repeated.
Sample HWG920, PFOS and PFOA in water by SPE/LCMS: Test repeated.

Results relate only to the items tested.

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Maxxam Job #: B8P4134
Report Date: 2018/10/11

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5760448	AD9	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		130	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		120	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		114	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		114	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		119	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		111	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		113	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		116	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		110	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		104	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		115	%	50 - 150
			D3-MeFOSAA	2018/10/05		106	%	50 - 150
			D5-EtFOSAA	2018/10/05		107	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05		89	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/05		98	%	70 - 130
			EtFOSAA	2018/10/05		91	%	70 - 130
			MeFOSAA	2018/10/05		94	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/05		104	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05		99	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/05		96	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05		100	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/05		91	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/05		90	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/05		96	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05		93	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/05		96	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/05		97	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05		93	%	70 - 130
5760448	AD9	Spiked Blank DUP	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		115	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		124	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		115	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		115	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		125	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		104	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		120	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		123	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		125	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		122	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		122	%	50 - 150
			D3-MeFOSAA	2018/10/05		107	%	50 - 150
			D5-EtFOSAA	2018/10/05		107	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05		94	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/05		93	%	70 - 130
			EtFOSAA	2018/10/05		91	%	70 - 130
			MeFOSAA	2018/10/05		94	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/05		103	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05		96	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/05		96	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05		101	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/05		92	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/05		95	%	70 - 130

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Maxxam Job #: B8P4134
Report Date: 2018/10/11

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorotridecanoic Acid	2018/10/05		100	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05		91	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/05		101	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/05		92	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05		91	%	70 - 130
5760448	AD9	RPD	6:2 Fluorotelomer sulfonate	2018/10/05	5.5		%	30
			8:2 Fluorotelomer sulfonate	2018/10/05	6.0		%	30
			EtFOSAA	2018/10/05	0.021		%	30
			MeFOSAA	2018/10/05	0.18		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/10/05	1.3		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05	2.9		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/10/05	0.36		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05	0.87		%	30
			Perfluorononanoic Acid (PFNA)	2018/10/05	1.4		%	30
			Perfluorotetradecanoic Acid	2018/10/05	4.8		%	30
			Perfluorotridecanoic Acid	2018/10/05	3.1		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05	2.2		%	30
			Perfluorodecanoic Acid (PFDA)	2018/10/05	5.1		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/10/05	5.7		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05	2.0		%	30
5760448	AD9	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		110	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		93	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		90	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		89	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		98	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		79	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		91	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		97	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		101	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		96	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		99	%	50 - 150
			D3-MeFOSAA	2018/10/05		80	%	50 - 150
			D5-EtFOSAA	2018/10/05		80	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05	0.015 U, LOD=0.015		ug/L	
			8:2 Fluorotelomer sulfonate	2018/10/05	0.015 U, LOD=0.015		ug/L	
			EtFOSAA	2018/10/05	0.010 U, LOD=0.010		ug/L	
			MeFOSAA	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluorononanoic Acid (PFNA)	2018/10/05	0.018 U, LOD=0.018		ug/L	

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Maxxam Job #: B8P4134
Report Date: 2018/10/11

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorotetradecanoic Acid	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorotridecanoic Acid	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorodecanoic Acid (PFDA)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
5762864	JDA	Spiked Blank	13C4-Perfluorooctanesulfonate	2018/10/06		92	%	50 - 150
			Perfluorooctane Sulfonate (PFOS)	2018/10/06		99	%	70 - 130
5762864	JDA	Method Blank	13C4-Perfluorooctanesulfonate	2018/10/06		94	%	50 - 150
			Perfluorooctane Sulfonate (PFOS)	2018/10/06	0.70 U, LOD=0.70		ug/L	
5762864	JDA	RPD - Sample/Sample Dup	Perfluorooctane Sulfonate (PFOS)	2018/10/06	5.1 (1)		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/10/06	15 (1)		%	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Due to high concentration of the target analyte, sample required high level analysis with additional serial dilutions. Detection limit was adjusted accordingly (10x). Post spike sample recovery is not applicable due to native concentration.

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Maxxam Job #: B8P4134
Report Date: 2018/10/11

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: FT021 (WATER)
Your P.O. #: 12198
Sampler Initials: MW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Colm McNamara, Senior Analyst, Liquid Chromatography

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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OTIE
An Oneida Nation Company

Maxxam Analytics

FT021
(water)

CHAIN OF CUSTODY RECORD

DATE: 25 SEPT 2018
PAGE: 1 OF 1

LABORATORY CLIENT	OTIE
ADDRESS	317 E. Main Street
CITY	Ventura
STATE	CA
ZIP	93001
E-MAIL	evasquez@otie.com; SGilbert@otie.com; jharting@otie.com
TEL	805-585-4314
FAX	805-585-2111
CLIENT PROJECT NAME / NUMBER	Vandenberg AFB 2016186-07
P.O. NO	12198
PROJECT CONTACT	Emmanuel Vasquez
LAB CONTACT / QUOTE NO	Stephanie Pollen / B64666
SAMPLER(S) (SIGNATURE)	[signature]
SDG #	

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
-OTIE specific EDDs
- level ~~III~~ IV data package ~~unless otherwise noted~~

Carrier: ☑ FedEx ☐ UPS ☑ Other

Tracking Number:

REQUESTED ANALYSIS

Preservation Codes:
NA = Not Applicable
T = Trizma
H = HCl
N = HNO_3
S = H_2SO_4
B = NaOH

Lab Use	SAMPLE ID	SAMPLING DATE	TIME	MATRIX	GRAB	COMP.	Start Depth	End Depth	No. of containers ↓	PFAS ASTM D7968-14 (NA)	PFAS EPA 537 Modified (NA)	PFAS EPA 537 Modified (T)					<-- Preservative / Remarks
	21-MW-1	09-21-18	1710	WG			—	—			X						
	DUP-FT021-1	092118	1715	WG			—	—			X						

Relinquished by: (Signature) [signature]	Received by: (Signature)	Date 09/25/18	Time 1450
Relinquished by: (Signature)	Received by: (Signature) for FRANCINE CHONG	Date 2018/09/27	Time 13:49
Relinquished by: (Signature)	Received by: (Signature)	Date	Time

27-Sep-18 13:49
Stephanie Pollen
B8P4134
J_L ENV-1314

3.2/1.5/1.4
#26600

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/16
Report #: R5443468
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8P4173
Received: 2018/09/27, 13:49

Sample Matrix: Soil
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Moisture	7	N/A	2018/10/01	CAM SOP-00445	Carter 2nd ed 51.2 m
PFOS and PFOA in soil by SPE/LCMS (1)	7	2018/10/05	2018/10/10	CAM SOP-00894	EPA537 m

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFOS and PFOA in water by SPE/LCMS (1)	1	2018/10/01	2018/10/05	CAM SOP-00894	EPA 537 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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Your P.O. #: 12198
Your Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your C.O.C. #: na

Attention:
Vandenberg AFB Reporting Group

Oneida Total Integrated Enterprises
317 East Main Street
Ventura, CA
USA 93001

Report Date: 2018/10/16
Report #: R5443468
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8P4173
Received: 2018/09/27, 13:49

Encryption Key

Stephanie Pollen
Project Manager
16 Oct 2018 17:22:49

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Stephanie Pollen, Project Manager
Email: SPollen@maxxam.ca
Phone# (905) 817-5700
==========
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Maxxam Job #: B8P4173
Report Date: 2018/10/16

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HWH112				HWH113	HWH114				
Sampling Date		2018/09/17 09:10				2018/09/17 09:20	2018/09/17 10:05				
COC Number		na				na	na				
	UNITS	**1992FS-B1-0.5**	**DL**	**LOD**	**LOQ**	**DUP2-1992FS-0.5**	**1992FS-B1-18**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics											
Moisture	%	15	0.50	N/A	1.0	14	17	0.50	N/A	1.0	5760275
Miscellaneous Parameters											
6:2 Fluorotelomer sulfonate	ug/kg	0.78 U	0.25	0.78	0.98	0.88 U	0.88 U	0.29	0.88	1.1	5769305
8:2 Fluorotelomer sulfonate	ug/kg	0.78 U	0.32	0.78	0.98	0.88 U	0.88 U	0.36	0.88	1.1	5769305
EtFOSAA	ug/kg	0.49 U	0.15	0.49	0.98	0.55 U	0.55 U	0.17	0.55	1.1	5769305
MeFOSAA	ug/kg	0.78 U	0.25	0.78	0.98	0.88 U	0.88 U	0.29	0.88	1.1	5769305
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.49 U	0.17	0.49	0.98	0.55 U	0.55 U	0.19	0.55	1.1	5769305
Perfluorodecanoic Acid (PFDA)	ug/kg	0.78 U	0.27	0.78	0.98	0.88 U	0.88 U	0.31	0.88	1.1	5769305
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.78 U	0.27	0.78	0.98	0.88 U	0.88 U	0.31	0.88	1.1	5769305
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.49 U	0.19	0.49	0.98	0.55 U	0.55 U	0.21	0.55	1.1	5769305
Perfluorohexane Sulfonate (PFHxS)	ug/kg	0.58 J	0.24	0.49	0.98	0.57 J	2.0	0.26	0.55	1.1	5769305
Perfluorohexanoic Acid (PFHxA)	ug/kg	0.49 U	0.14	0.49	0.98	0.55 U	0.66 J	0.15	0.55	1.1	5769305
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	0.78 U	0.25	0.78	0.98	0.88 U	0.68 J	0.28	0.88	1.1	5769305
Perfluorononanoic Acid (PFNA)	ug/kg	0.49 U	0.22	0.49	0.98	0.55 U	0.55 U	0.24	0.55	1.1	5769305
Perfluorooctane Sulfonate (PFOS)	ug/kg	5.7	0.25	0.78	0.98	5.1	2.9	0.29	0.88	1.1	5769305
Perfluorotetradecanoic Acid	ug/kg	0.78 U	0.30	0.78	0.98	0.88 U	0.88 U	0.34	0.88	1.1	5769305
Perfluorotridecanoic Acid	ug/kg	0.78 U	0.32	0.78	0.98	0.88 U	0.88 U	0.36	0.88	1.1	5769305
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.78 U	0.33	0.78	0.98	0.88 U	0.88 U	0.37	0.88	1.1	5769305
Surrogate Recovery (%)											
13C2-6:2 Fluorotelomer sulfonate	%	84				100	97				5769305
13C2-8:2 Fluorotelomer sulfonate	%	90				93	97				5769305
13C2-Perfluorodecanoic acid	%	67				81	85				5769305
13C2-Perfluorododecanoic acid	%	65				67	95				5769305
13C2-Perfluorohexanoic acid	%	84				90	87				5769305
13C2-perfluorotetradecanoic acid	%	67				69	85				5769305
13C2-Perfluoroundecanoic acid	%	68				79	84				5769305
13C4-Perfluoroheptanoic acid	%	87				87	90				5769305
13C4-Perfluorooctanesulfonate	%	80				81	88				5769305
13C4-Perfluorooctanoic acid	%	78				86	84				5769305
13C5-Perfluorononanoic acid	%	84				87	83				5769305

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8P4173
Report Date: 2018/10/16

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HWH112				HWH113	HWH114				
Sampling Date		2018/09/17 09:10				2018/09/17 09:20	2018/09/17 10:05				
COC Number		na				na	na				
	UNITS	**1992FS-B1-0.5**	**DL**	**LOD**	**LOQ**	**DUP2-1992FS-0.5**	**1992FS-B1-18**	**DL**	**LOD**	**LOQ**	**QC Batch**
18O2-Perfluorohexanesulfonate	%	72				88	84				5769305
D3-MeFOSAA	%	68				58	68				5769305
D5-EtFOSAA	%	69				60	82				5769305

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8P4173
Report Date: 2018/10/16

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HWH115				HWH116				
Sampling Date		2018/09/17 12:40				2018/09/17 14:10				
COC Number		na				na				
	UNITS	**1992FS-B2-0.5**	**DL**	**LOD**	**LOQ**	**1992FS-B2-28.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics										
Moisture	%	1.9	0.50	N/A	1.0	13	0.50	N/A	1.0	5760275
Miscellaneous Parameters										
6:2 Fluorotelomer sulfonate	ug/kg	0.78 U	0.25	0.78	0.97	0.88 U	0.29	0.88	1.1	5769305
8:2 Fluorotelomer sulfonate	ug/kg	0.78 U	0.32	0.78	0.97	0.88 U	0.36	0.88	1.1	5769305
EtFOSAA	ug/kg	0.49 U	0.15	0.49	0.97	0.55 U	0.17	0.55	1.1	5769305
MeFOSAA	ug/kg	0.78 U	0.25	0.78	0.97	0.88 U	0.29	0.88	1.1	5769305
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.49 U	0.16	0.49	0.97	0.55 U	0.19	0.55	1.1	5769305
Perfluorodecanoic Acid (PFDA)	ug/kg	0.78 U	0.27	0.78	0.97	0.88 U	0.31	0.88	1.1	5769305
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.78 U	0.27	0.78	0.97	0.88 U	0.31	0.88	1.1	5769305
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.49 U	0.18	0.49	0.97	0.55 U	0.21	0.55	1.1	5769305
Perfluorohexane Sulfonate (PFHxS)	ug/kg	0.54 J	0.23	0.49	0.97	1.3	0.26	0.55	1.1	5769305
Perfluorohexanoic Acid (PFHxA)	ug/kg	0.49 U	0.14	0.49	0.97	0.55 U	0.15	0.55	1.1	5769305
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	0.56 J	0.24	0.78	0.97	0.88 U	0.28	0.88	1.1	5769305
Perfluorononanoic Acid (PFNA)	ug/kg	0.49 U	0.21	0.49	0.97	0.55 U	0.24	0.55	1.1	5769305
Perfluorooctane Sulfonate (PFOS)	ug/kg	9.6	0.25	0.78	0.97	0.88 U	0.29	0.88	1.1	5769305
Perfluorotetradecanoic Acid	ug/kg	0.78 U	0.30	0.78	0.97	0.88 U	0.34	0.88	1.1	5769305
Perfluorotridecanoic Acid	ug/kg	0.78 U	0.32	0.78	0.97	0.88 U	0.36	0.88	1.1	5769305
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.78 U	0.33	0.78	0.97	0.88 U	0.37	0.88	1.1	5769305
Surrogate Recovery (%)										
13C2-6:2 Fluorotelomer sulfonate	%	91				103				5769305
13C2-8:2 Fluorotelomer sulfonate	%	103				95				5769305
13C2-Perfluorodecanoic acid	%	89				90				5769305
13C2-Perfluorododecanoic acid	%	72				91				5769305
13C2-Perfluorohexanoic acid	%	86				97				5769305
13C2-perfluorotetradecanoic acid	%	82				71				5769305
13C2-Perfluoroundecanoic acid	%	75				88				5769305
13C4-Perfluoroheptanoic acid	%	92				97				5769305
13C4-Perfluorooctanesulfonate	%	92				91				5769305
13C4-Perfluorooctanoic acid	%	89				90				5769305
13C5-Perfluorononanoic acid	%	99				91				5769305

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8P4173
Report Date: 2018/10/16

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HWH115				HWH116				
Sampling Date		2018/09/17 12:40				2018/09/17 14:10				
COC Number		na				na				
	UNITS	**1992FS-B2-0.5**	**DL**	**LOD**	**LOQ**	**1992FS-B2-28.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
18O2-Perfluorohexanesulfonate	%	92				89				5769305
D3-MeFOSAA	%	71				84				5769305
D5-EtFOSAA	%	64				81				5769305

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QC Batch = Quality Control Batch
N/A = Not Applicable

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Oneida Total Integrated Enterprises
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Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HWH117					HWH118				
Sampling Date		2018/09/18 08:00					2018/09/18 09:10				
COC Number		na					na				
	UNITS	**1992FS-B3-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**	**1992FS-B3-23.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
Inorganics											
Moisture	%	3.4	0.50	N/A	1.0	5760275	15	0.50	N/A	1.0	5760275
Miscellaneous Parameters											
6:2 Fluorotelomer sulfonate	ug/kg	0.70 U	0.23	0.70	0.87	5769305	0.78 U	0.25	0.78	0.97	5769305
8:2 Fluorotelomer sulfonate	ug/kg	0.70 U	0.29	0.70	0.87	5769305	0.78 U	0.32	0.78	0.97	5769305
EtFOSAA	ug/kg	0.45 U	0.13	0.45	0.89	5777346	0.49 U	0.15	0.49	0.97	5769305
MeFOSAA	ug/kg	0.71 U	0.23	0.71	0.89	5777346	0.78 U	0.25	0.78	0.97	5769305
Perfluorobutane Sulfonate (PFBS)	ug/kg	0.44 U	0.15	0.44	0.87	5769305	0.49 U	0.16	0.49	0.97	5769305
Perfluorodecanoic Acid (PFDA)	ug/kg	0.70 U	0.24	0.70	0.87	5769305	0.78 U	0.27	0.78	0.97	5769305
Perfluorododecanoic Acid (PFDoA)	ug/kg	0.71 U	0.25	0.71	0.89	5777346	0.78 U	0.27	0.78	0.97	5769305
Perfluoroheptanoic Acid (PFHpA)	ug/kg	0.44 U	0.17	0.44	0.87	5769305	0.49 U	0.18	0.49	0.97	5769305
Perfluorohexane Sulfonate (PFHxS)	ug/kg	2.9	0.21	0.44	0.87	5769305	0.56 J	0.23	0.49	0.97	5769305
Perfluorohexanoic Acid (PFHxA)	ug/kg	0.55 J	0.12	0.44	0.87	5769305	0.49 U	0.14	0.49	0.97	5769305
Perfluoro-n-Octanoic Acid (PFOA)	ug/kg	2.5	0.22	0.70	0.87	5769305	0.78 U	0.24	0.78	0.97	5769305
Perfluorononanoic Acid (PFNA)	ug/kg	0.53 J	0.19	0.44	0.87	5769305	0.49 U	0.21	0.49	0.97	5769305
Perfluorooctane Sulfonate (PFOS)	ug/kg	29	0.23	0.70	0.87	5769305	0.78 U	0.25	0.78	0.97	5769305
Perfluorotetradecanoic Acid	ug/kg	0.71 U	0.28	0.71	0.89	5777346	0.78 U	0.30	0.78	0.97	5769305
Perfluorotridecanoic Acid	ug/kg	0.71 U	0.29	0.71	0.89	5777346	0.78 U	0.32	0.78	0.97	5769305
Perfluoroundecanoic Acid (PFUnA)	ug/kg	0.71 U	0.30	0.71	0.89	5777346	0.78 U	0.33	0.78	0.97	5769305
Surrogate Recovery (%)											
13C2-6:2 Fluorotelomer sulfonate	%	91				5769305	100				5769305
13C2-8:2 Fluorotelomer sulfonate	%	81				5769305	110				5769305
13C2-Perfluorodecanoic acid	%	91				5769305	83				5769305
13C2-Perfluorododecanoic acid	%	28 (1)				5777346	80				5769305
13C2-Perfluorohexanoic acid	%	89				5769305	107				5769305
13C2-perfluorotetradecanoic acid	%	65				5777346	68				5769305
13C2-Perfluoroundecanoic acid	%	35 (1)				5777346	93				5769305

DL = Detection Limit
LOD = Limit of Detection
LOQ = Limit of Quantitation
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Because quantitation is performed using isotope dilution techniques, any losses of the native compound that may occur during any of the sample preparation, extraction, cleanup or determinative steps will be mirrored by a similar loss of the labeled standard, and as such can be accounted for and corrected. Therefore, the quantification of these target compounds is not affected by the low extracted internal standard analyte recovery.

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Maxxam Job #: B8P4173
Report Date: 2018/10/16

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your P.O. #: 12198
Sampler Initials: MW

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HWH117					HWH118				
Sampling Date		2018/09/18 08:00					2018/09/18 09:10				
COC Number		na					na				
	UNITS	**1992FS-B3-0.5**	**DL**	**LOD**	**LOQ**	**QC Batch**	**1992FS-B3-23.5**	**DL**	**LOD**	**LOQ**	**QC Batch**
13C4-Perfluoroheptanoic acid	%	89				5769305	107				5769305
13C4-Perfluorooctanesulfonate	%	106				5769305	95				5769305
13C4-Perfluorooctanoic acid	%	81				5769305	96				5769305
13C5-Perfluorononanoic acid	%	91				5769305	99				5769305
18O2-Perfluorohexanesulfonate	%	85				5769305	99				5769305
D3-MeFOSAA	%	16 (1)				5777346	88				5769305
D5-EtFOSAA	%	25 (1)				5777346	84				5769305

DL = Detection Limit
LOD = Limit of Detection
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QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Because quantitation is performed using isotope dilution techniques, any losses of the native compound that may occur during any of the sample preparation, extraction, cleanup or determinative steps will be mirrored by a similar loss of the labeled standard, and as such can be accounted for and corrected. Therefore, the quantification of these target compounds is not affected by the low extracted internal standard analyte recovery.

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Sampler Initials: MW

RESULTS OF ANALYSES OF WATER

Maxxam ID		HWH119				
Sampling Date		2018/09/17 15:45				
COC Number		na				
	UNITS	**EQB6-091718**	**DL**	**LOD**	**LOQ**	**QC Batch**
Miscellaneous Parameters						
6:2 Fluorotelomer sulfonate	ug/L	0.015 U	0.0066	0.015	0.020	5760448
8:2 Fluorotelomer sulfonate	ug/L	0.015 U	0.0066	0.015	0.020	5760448
EtFOSAA	ug/L	0.010 U	0.0033	0.010	0.020	5760448
MeFOSAA	ug/L	0.010 U	0.0029	0.010	0.020	5760448
Perfluorobutane Sulfonate (PFBS)	ug/L	0.015 U	0.0054	0.015	0.020	5760448
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.015 U	0.0074	0.015	0.020	5760448
Perfluorohexanoic Acid (PFHxA)	ug/L	0.010 U	0.0035	0.010	0.020	5760448
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.015 U	0.0056	0.015	0.020	5760448
Perfluorononanoic Acid (PFNA)	ug/L	0.018 U	0.0087	0.018	0.020	5760448
Perfluorotetradecanoic Acid	ug/L	0.010 U	0.0027	0.010	0.020	5760448
Perfluorotridecanoic Acid	ug/L	0.010 U	0.0038	0.010	0.020	5760448
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.010 U	0.0025	0.010	0.020	5760448
Perfluorodecanoic Acid (PFDA)	ug/L	0.015 U	0.0061	0.015	0.020	5760448
Perfluorododecanoic Acid (PFDoA)	ug/L	0.010 U	0.0050	0.010	0.020	5760448
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.010 U	0.0033	0.010	0.020	5760448
Perfluorooctane Sulfonate (PFOS)	ug/L	0.015 U	0.0060	0.015	0.020	5760448
Surrogate Recovery (%)						
13C2-6:2 Fluorotelomer sulfonate	%	117				5760448
13C2-8:2 Fluorotelomer sulfonate	%	111				5760448
13C2-Perfluorodecanoic acid	%	109				5760448
13C2-Perfluorododecanoic acid	%	107				5760448
13C2-Perfluorohexanoic acid	%	113				5760448
13C2-perfluorotetradecanoic acid	%	96				5760448
13C2-Perfluoroundecanoic acid	%	108				5760448
13C4-Perfluoroheptanoic acid	%	116				5760448
13C4-Perfluorooctanesulfonate	%	118				5760448
13C4-Perfluorooctanoic acid	%	117				5760448
13C5-Perfluorononanoic acid	%	111				5760448
18O2-Perfluorohexanesulfonate	%	117				5760448
D3-MeFOSAA	%	73				5760448

DL = Detection Limit
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N/A = Not Applicable

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Sampler Initials: MW

RESULTS OF ANALYSES OF WATER

Maxxam ID		HWH119				
Sampling Date		2018/09/17 15:45				
COC Number		na				
	UNITS	**EQB6-091718**	**DL**	**LOD**	**LOQ**	**QC Batch**
D5-EtFOSAA	%	83				5760448

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N/A = Not Applicable

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Oneida Total Integrated Enterprises
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Site Location: 1992 FUEL SPILL (SOIL)
Your P.O. #: 12198
Sampler Initials: MW

TEST SUMMARY

Maxxam ID: HWH112
Sample ID: 1992FS-B1-0.5
Matrix: Soil

Collected: 2018/09/17
Shipped:
Received: 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5760275	N/A	2018/10/01	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5769305	2018/10/05	2018/10/10	Sin Chii Chia

Maxxam ID: HWH113
Sample ID: DUP2-1992FS-0.5
Matrix: Soil

Collected: 2018/09/17
Shipped:
Received: 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5760275	N/A	2018/10/01	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5769305	2018/10/05	2018/10/10	Sin Chii Chia

Maxxam ID: HWH114
Sample ID: 1992FS-B1-18
Matrix: Soil

Collected: 2018/09/17
Shipped:
Received: 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5760275	N/A	2018/10/01	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5769305	2018/10/05	2018/10/10	Sin Chii Chia

Maxxam ID: HWH115
Sample ID: 1992FS-B2-0.5
Matrix: Soil

Collected: 2018/09/17
Shipped:
Received: 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5760275	N/A	2018/10/01	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5769305	2018/10/05	2018/10/10	Sin Chii Chia

Maxxam ID: HWH116
Sample ID: 1992FS-B2-28.5
Matrix: Soil

Collected: 2018/09/17
Shipped:
Received: 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5760275	N/A	2018/10/01	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5769305	2018/10/05	2018/10/10	Sin Chii Chia

Maxxam ID: HWH117
Sample ID: 1992FS-B3-0.5
Matrix: Soil

Collected: 2018/09/18
Shipped:
Received: 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5760275	N/A	2018/10/01	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5769305	2018/10/05	2018/10/10	Sin Chii Chia

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Sampler Initials: MW

TEST SUMMARY

Maxxam ID: HWH118
Sample ID: 1992FS-B3-23.5
Matrix: Soil

Collected: 2018/09/18
Shipped:
Received: 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5760275	N/A	2018/10/01	Prgya Panchal
PFOS and PFOA in soil by SPE/LCMS	LCMS	5769305	2018/10/05	2018/10/10	Sin Chii Chia

Maxxam ID: HWH119
Sample ID: EQB6-091718
Matrix: Water

Collected: 2018/09/17
Shipped:
Received: 2018/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water by SPE/LCMS	LCMS	5760448	2018/10/01	2018/10/05	Anjan Desai

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Sample HWH117, PFOS and PFOA in soil by SPE/LCMS: Test repeated.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5760275	NKG	RPD - Sample/Sample Dup	Moisture	2018/10/01	2.0		%	20
5760448	AD9	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		130	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		120	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		114	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		114	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		119	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		111	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		113	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		116	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/05		109	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		110	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		104	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		115	%	50 - 150
			D3-MeFOSAA	2018/10/05		106	%	50 - 150
			D5-EtFOSAA	2018/10/05		107	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05		89	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/05		98	%	70 - 130
			EtFOSAA	2018/10/05		91	%	70 - 130
			MeFOSAA	2018/10/05		94	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/05		104	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05		99	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/05		96	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05		100	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/05		91	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/05		90	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/05		96	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05		93	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/05		96	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/05		97	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05		93	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/05		101	%	70 - 130
5760448	AD9	Spiked Blank DUP	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		115	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		124	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		115	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		115	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		125	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		104	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		120	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		123	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/05		123	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		125	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		122	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		122	%	50 - 150
			D3-MeFOSAA	2018/10/05		107	%	50 - 150
			D5-EtFOSAA	2018/10/05		107	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05		94	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/05		93	%	70 - 130
			EtFOSAA	2018/10/05		91	%	70 - 130
			MeFOSAA	2018/10/05		94	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/05		103	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05		96	%	70 - 130

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Maxxam Job #: B8P4173
Report Date: 2018/10/16

Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your P.O. #: 12198
Sampler Initials: MW

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorohexanoic Acid (PFHxA)	2018/10/05		96	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05		101	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/05		92	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/05		95	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/05		100	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05		91	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/05		101	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/05		92	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05		91	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/05		99	%	70 - 130
5760448	AD9	RPD	6:2 Fluorotelomer sulfonate	2018/10/05	5.5		%	30
			8:2 Fluorotelomer sulfonate	2018/10/05	6.0		%	30
			EtFOSAA	2018/10/05	0.021		%	30
			MeFOSAA	2018/10/05	0.18		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/10/05	1.3		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05	2.9		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/10/05	0.36		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05	0.87		%	30
			Perfluorononanoic Acid (PFNA)	2018/10/05	1.4		%	30
			Perfluorotetradecanoic Acid	2018/10/05	4.8		%	30
			Perfluorotridecanoic Acid	2018/10/05	3.1		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05	2.2		%	30
			Perfluorodecanoic Acid (PFDA)	2018/10/05	5.1		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/10/05	5.7		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05	2.0		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/10/05	2.4		%	30
5760448	AD9	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/05		110	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/05		93	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/05		90	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/05		89	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/05		98	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/05		79	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/05		91	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/05		97	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/05		95	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/05		101	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/05		96	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/05		99	%	50 - 150
			D3-MeFOSAA	2018/10/05		80	%	50 - 150
			D5-EtFOSAA	2018/10/05		80	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/05	0.015 U, LOD=0.015		ug/L	
			8:2 Fluorotelomer sulfonate	2018/10/05	0.015 U, LOD=0.015		ug/L	
			EtFOSAA	2018/10/05	0.010 U, LOD=0.010		ug/L	
			MeFOSAA	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2018/10/05	0.015 U, LOD=0.015		ug/L	

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Oneida Total Integrated Enterprises
Client Project #: VANDENBERG AFB 2016186-07
Site Location: 1992 FUEL SPILL (SOIL)
Your P.O. #: 12198
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroheptanoic Acid (PFHpA)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluorononanoic Acid (PFNA)	2018/10/05	0.018 U, LOD=0.018		ug/L	
			Perfluorotetradecanoic Acid	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorotridecanoic Acid	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorodecanoic Acid (PFDA)	2018/10/05	0.015 U, LOD=0.015		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/05	0.010 U, LOD=0.010		ug/L	
			Perfluorooctane Sulfonate (PFOS)	2018/10/05	0.015 U, LOD=0.015		ug/L	
5769305	SCH	Matrix Spike(HWH115)	13C2-6:2 Fluorotelomer sulfonate	2018/10/10		90	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/10		94	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/10		84	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/10		69	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/10		93	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/10		78	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/10		65	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/10		91	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/10		109	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/10		88	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/10		92	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/10		92	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/10		82	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/10		88	%	70 - 130
			D3-MeFOSAA	2018/10/10		77	%	50 - 150
			D5-EtFOSAA	2018/10/10		78	%	50 - 150
			EtFOSAA	2018/10/10		82	%	70 - 130
			MeFOSAA	2018/10/10		83	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/10		81	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/10		88	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/10		98	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/10		86	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/10		84	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/10		75	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/10		85	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/10		86	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/10		75	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/10		83	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/10		87	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorooctane Sulfonate (PFOS)	2018/10/10		74	%	70 - 130
5769305	SCH	Matrix Spike DUP(HWH115)	13C2-6:2 Fluorotelomer sulfonate	2018/10/10		112	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/10		108	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/10		90	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/10		73	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/10		95	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/10		76	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/10		73	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/10		105	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/10		104	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/10		96	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/10		100	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/10		104	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/10		74	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/10		91	%	70 - 130
			D3-MeFOSAA	2018/10/10		71	%	50 - 150
			D5-EtFOSAA	2018/10/10		65	%	50 - 150
			EtFOSAA	2018/10/10		94	%	70 - 130
			MeFOSAA	2018/10/10		82	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/10		78	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/10		78	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/10		88	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/10		83	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/10		88	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/10		82	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/10		86	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/10		80	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/10		72	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/10		89	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/10		90	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/10		84	%	70 - 130
5769305	SCH	MS/MSD RPD	6:2 Fluorotelomer sulfonate	2018/10/10	10		%	30
			8:2 Fluorotelomer sulfonate	2018/10/10	3.6		%	30
			EtFOSAA	2018/10/10	14		%	30
			MeFOSAA	2018/10/10	0.97		%	30
			Perfluorobutane Sulfonate (PFBS)	2018/10/10	4.0		%	30
			Perfluorodecanoic Acid (PFDA)	2018/10/10	12		%	30
			Perfluorododecanoic Acid (PFDoA)	2018/10/10	10		%	30
			Perfluorononanoic Acid (PFNA)	2018/10/10	4.3		%	30
			Perfluorotetradecanoic Acid	2018/10/10	4.2		%	30
			Perfluorotridecanoic Acid	2018/10/10	9.7		%	30
			Perfluoroundecanoic Acid (PFUnA)	2018/10/10	1.4		%	30
			Perfluoroheptanoic Acid (PFHpA)	2018/10/10	8.2		%	30
			Perfluorohexane Sulfonate (PFHxS)	2018/10/10	4.3		%	30
			Perfluorohexanoic Acid (PFHxA)	2018/10/10	6.5		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/10	3.6		%	30
			Perfluorooctane Sulfonate (PFOS)	2018/10/10	12		%	30
5769305	SCH	Spiked Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/10		85	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/10		80	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/10		87	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/10		76	%	50 - 150

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C2-Perfluorohexanoic acid	2018/10/10		88	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/10		75	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/10		81	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/10		88	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/10		84	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/10		80	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/10		85	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/10		84	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/10		84	%	70 - 130
			8:2 Fluorotelomer sulfonate	2018/10/10		103	%	70 - 130
			D3-MeFOSAA	2018/10/10		70	%	50 - 150
			D5-EtFOSAA	2018/10/10		67	%	50 - 150
			EtFOSAA	2018/10/10		98	%	70 - 130
			MeFOSAA	2018/10/10		94	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2018/10/10		93	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2018/10/10		83	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2018/10/10		100	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2018/10/10		86	%	70 - 130
			Perfluorotetradecanoic Acid	2018/10/10		88	%	70 - 130
			Perfluorotridecanoic Acid	2018/10/10		88	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2018/10/10		92	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2018/10/10		93	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2018/10/10		88	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2018/10/10		91	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2018/10/10		93	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2018/10/10		86	%	70 - 130
5769305	SCH	Method Blank	13C2-6:2 Fluorotelomer sulfonate	2018/10/10		65	%	50 - 150
			13C2-8:2 Fluorotelomer sulfonate	2018/10/10		78	%	50 - 150
			13C2-Perfluorodecanoic acid	2018/10/10		65	%	50 - 150
			13C2-Perfluorododecanoic acid	2018/10/10		67	%	50 - 150
			13C2-Perfluorohexanoic acid	2018/10/10		82	%	50 - 150
			13C2-perfluorotetradecanoic acid	2018/10/10		65	%	50 - 150
			13C2-Perfluoroundecanoic acid	2018/10/10		66	%	50 - 150
			13C4-Perfluoroheptanoic acid	2018/10/10		81	%	50 - 150
			13C4-Perfluorooctanesulfonate	2018/10/10		66	%	50 - 150
			13C4-Perfluorooctanoic acid	2018/10/10		76	%	50 - 150
			13C5-Perfluorononanoic acid	2018/10/10		88	%	50 - 150
			18O2-Perfluorohexanesulfonate	2018/10/10		69	%	50 - 150
			6:2 Fluorotelomer sulfonate	2018/10/10	0.80 U, LOD=0.80		ug/kg	
			8:2 Fluorotelomer sulfonate	2018/10/10	0.80 U, LOD=0.80		ug/kg	
			D3-MeFOSAA	2018/10/10		67	%	50 - 150
			D5-EtFOSAA	2018/10/10		60	%	50 - 150
			EtFOSAA	2018/10/10	0.50 U, LOD=0.50		ug/kg	
			MeFOSAA	2018/10/10	0.80 U, LOD=0.80		ug/kg	
			Perfluorobutane Sulfonate (PFBS)	2018/10/10	0.50 U, LOD=0.50		ug/kg	

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